The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

VOL. X. No. 239 JANUARY 12, 1924 Prepaid Annual Subscription United Kingdom, £1.1.0; Abroad, £1.6.0.

Contents

	PAGE
EDITORIAL NOTES: A Chemical Programme for 1924; An Attempt to Check Diffusion; America's Need of Export Trade; New Work on Chloride Volatilisation; The Chemical Foundation Suit	27
How Can Consulting Chemists Extend their Practice?	30
The Danger of Excessive Specialisation	31
Reviews	32
Society of Chemical Industry	34
Chemistry in Rubber Manufacture	35
CORRESPONDENCE: French Potash Output etc.	35
Institution of Petroleum Technologists	36
Utilisation of Scientific Discoveries	37
Utilisation of Straw	38
From Week to Week	41
References to Current Literature	42
Patent Literature	43
Market Reports and Current Prices	46
Company News	51
Commercial Intelligence	52

NOTICES.—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

The prepaid subscription to THE CHEMICAL AGE *is 21s. per annum for the United Kingdom, and 26s. abroad. Cheques, Money Orders and Postal Orders should be made payable to Benn Brothers, Ltd.*

Editorial and General Offices—8, Bouverie St., London, E.C.4.

Telegrams: "Allangas, Fleet, London." Telephone: City 9852 (6 lines)

A Chemical Programme for 1924

IF a visitor interested in the conditions of British chemical industry inquired what the programme or policy was for the coming year we fear it would be difficult to give him any positive answer. Most of the organisations would probably refer to their membership, their finance, their list of officials, their annual dinner, but might find it hard to point to anything beyond the maintenance of these things at an average level. In other words, the emphasis would mostly be placed on the maintenance of machinery rather than on the attainment of ends. Yet the maintenance of machinery is really nothing more than means to an end, and machinery is only useful in so far as it produces something, and if possible something new. It seems to us—and the point is often raised by others—that the work of all the chemical societies would gain substantially if each set before itself, in addition to its normal conventional duties, some special aim each year the attainment of which would mark a definite advance.

Opinion is moving slowly in this direction, and some organisations are more inclined than formerly to get out of the rut and work for definite objects. The Institute of Chemistry has been actively engaged in quickening the life of the Sections; the B.A.C. has developed a comprehensive and ambitious programme; a progressive spirit is very marked in the field of chemical engineering; there are signs of renewed life in the Royal Institution; and some of the smaller societies are displaying increased activity. The most striking example of a policy, however, is supplied by the Association of British Chemical Manufacturers in its organisation of the Chemistry Section at the British Empire Exhibition. Here is something large and public-spirited, involving a liberal expenditure of time, money, and energy, intended not for the domestic benefit of the Association itself—though the Association will not lose by its labours—but for the good of British chemical industry as a whole. When it is all over it will be felt by everyone that something has been done which was worth doing, something big and enterprising and original. A policy merely of self-preservation brings no good to any organisation in the long run; what is wanted is more public-spirited effort of the sort referred to on behalf of an industry or a cause. Dr. Herty, who was recently over here, put the point clearly in an address on his return. True publicity for chemistry, he said, must take the form of a proposition for the public good and not mere propaganda for chemists or chemical organisations. Societies must find their final justification in the service they render, not in contentment with a comfortable existence for themselves.

An Attempt to Check Diffusion

IN the report just published by the Food Investigation Board of the Department of Scientific and Industrial Research reference is made to some interesting experiments which were conducted by the Engineering Committee in connection with the diffusion of gases through porous materials. The connection between such a subject and food storage problems will be understood when it is remembered that for certain articles of food (fruit and vegetables) systems of "gas storage" are employed, but the problem which has to be faced in these systems is the high rate of leakage of carbon dioxide through the walls of the chamber. Accordingly, for the operation of the gas storage method of preservation it is necessary to have the walls of the chamber fairly gas-tight, otherwise diffusion of the carbon dioxide prevents the accumulation of the gas to the desired concentration. In the experiments a number of slabs were prepared, and the rate of leakage of carbon dioxide before and after treatment of the surface of the slabs was determined, the leakage taking place under the influence of an excess pressure on one side.

Chemists who are interested in diffusion problems might do well to take note of the coating materials which were applied to the slabs. These materials included lead foil, various paints and varnishes, rubber latex, and dope. The instructive conclusion was arrived at that a gas such as carbon dioxide can escape

through a porous slab in more than one way. It may move as in pure diffusion (where the rate of flow is proportional to the pressure excess), but in plaster and similar materials there are various microscopical holes and channels in which the gas may flow as a stream does through pipes. As regards preventive coverings it is obvious that the ideal would be found in thin metal foil applied in such a manner as to avoid perforation ; but one serious disadvantage appertains to the use of lead foil, namely, that it is attacked chemically by carbon dioxide in the presence of moisture. The most effective among the paints so far examined were Necol varnish, lead paint, and tar-naphtha black, but aluminium paint was found to be inferior, while bitumen was slightly less effective than aluminium paint. It is a matter of interest to note that results with processes which embody the spraying of metals such as lead onto a surface were disappointing. This is rather contrary to what would be expected, but apparently in such treatment the deposit is not uniform, and it seems probable that minute holes are left between the particles.

America's Need of Export Trade

ONLY through export consumption, we are told in an official communication just received, can America expect to maintain chemical production at present levels and sell all her goods. As the export market for American chemicals (which reached its highest point in 1919-20 and rapidly dwindled away thereafter as European plants gradually recovered their facilities for production, and exchange went to pieces) cannot be regained immediately, Mr. Roth, manager of the Chemical Industries Exposition, proposes a broad campaign, first of all, to interest the foreign buyer of chemicals and chemical equipment in American products through publicity. By attracting consumers from India, South America, China, Africa and other sections of the globe, without chemical or equipment plants, to the Chemical Exposition which will be held in New York, September 28 to October 3, 1925, he believes that American goods can be brought more vividly, as well as more favourably, to the mind of the export buyer. The plan to focus the attention of foreign chemical consumers on American facilities for supplying equipment and the materials which go with this equipment, will take the form of a campaign to be carried on in various parts of the world throughout 1924 and 1925 until the time of the Tenth Chemical Exposition in the Fall of the latter year. American chemicals and American apparatus, new products, new uses for old products, and other features will be described. In this manner a large attendance of foreign buying-power is expected to be attracted to New York to see America's equipment, chemicals, dyes and allied products on display in October, 1925.

This policy points to two interesting facts. The first is that American home markets, not only in chemicals, but in many other industries, are no longer able to absorb the American home output. The second is that within a period of ten years New York has become the centre of America's chemical distribution. Practically every big manufacturer of chemical products, not only in the United States but all over the world, now has a representative in the Metropolitan district. Various estimates place the total sales made of American chemicals in New York or through New York offices at anything from fifty to seventy-five per cent. of the chemical business of the United States. Of the imported chemical products, fully three-quarters go in at the Port of New York, and estimates indicate that from eighty to ninety per cent. of all imported chemicals are sold originally through agents acting in New York prior to distribution throughout the country. It is because of this concentration of chemical sales and distribution interests that the 1925 Chemical Exposition is again fixed at the Grand Central Palace, New York, when the tenth anniversary of the original Exposition in 1915 will be celebrated.

New Work on Chloride Volatilisation

IT has been said that, if capable of general application, the chloride volatilisation process would fill a long-felt want in methods for treatment of minerals and ores, particularly of those ores containing copper, lead, or silver. Such ores are difficult to treat by gravity-concentration or by flotation ; and, although no radical changes are yet to be looked for, it is obvious that chloride volatilisation can find a distinct place as a means of treatment in the case of those materials which are not readily amenable to present methods. Our attention is directed to this subject by a report which we have lately received from the U.S. Bureau of Mines, and which provides the most comprehensive survey of the chloride volatilisation process that we have yet met with. For the benefit of those who have not followed up the process we should explain that it is a method for separating or isolating certain metals from worthless gangue or other minerals by means of alkali or alkaline earth halides—such as salt and calcium chloride—which are added to the prepared ores in proper amounts, treated in a suitably-designed furnace at temperatures high enough to form and to vaporise or volatilise the chlorides of the metals present. The exact chemical reactions are not definitely known. Vaporous chlorides of certain metals in the ores are formed and are drawn away from the heated charge into properly provided containers, and afterwards recovered. Some few years ago in America the problem of effectually utilising the process was attacked, and the invention of the Cottrell electrical precipitator made the difficult question of recovering the fumes evolved in volatilisation far more easy of solution.

An important point raised by the authors of the recent report is that most previous investigators of chloridising felt that the addition of sulphides to the roasting charge was necessary in order to provide sulphurous gases that could act on the salt employed, thus producing a chloridising atmosphere. The work of the Bureau of Mines on oxidised ores has, however, shown that the presence of sulphur compounds is not only unnecessary but often deleterious. As disposal or treatment of the fume is of such importance it should be mentioned that the tests showed that with a clean fuel little or no difficulty is experienced in reducing the fumes, either lead or copper, to the metallic form in the presence of proper amounts of lime or limestone and powdered coke, coal, or charcoal. Several different furnaces were tried, and with carefully controlled

temperatures a very small percentage of the metal chlorides were found to be volatilised in the reduction process. It is interesting to recall that the chloride volatilisation process has been receiving the prominent attention of metallurgists for some 20 years, but never yet has it been sufficiently developed along metallurgical lines to warrant even a guess at the ultimate place it may occupy in the mineral industry.

The Chemical Foundation Suit

FROM a brief press message from Washington, dated January 3, it would appear that the U.S.A. Federal District Court, after a long and exhaustive investigation, has sustained the sale of German dyestuffs and chemical patents to the Chemical Foundation, and that the Department of Justice has already announced its intention to appeal. Unlike the usage of the corresponding legal authority in this country, the Department adds in advance that it has every confidence in ultimately winning the case, and regardless of the restrictions in this country imposed on cases still *sub judice* the matter will no doubt be freely discussed in the American press. The whole transaction indicates the remarkable way in which some things are done in the United States. The sale of these German patents during the war was an official act, and in the ordinary way the parties responsible for it would accept the liability. The U.S.A. Government, however—or the legal authorities acting for them—now contend that the sum of 250,000 dollars paid for the 4,800 enemy-owned patents was totally inadequate, and that the Government agents were not fully informed of their true value when the property was sold. In that case it might be assumed that the Government or their agents, having made a bad bargain for enemy subjects, should make good the loss to them themselves. The official view, however, is that after the lapse of some years the sale should be rescinded and the purchasers penalised. The case is regarded as one of vital importance to the American chemical industry, and the attempt of the Government to declare the transaction invalid will no doubt be fought vigorously, as it has been done—and successfully—up to now.

German Nitrogen and Potash

ADVICES from Germany indicate that since June of last year, one of the best sales months on record, the potash industry has suffered badly, largely as the result of the Property Tax Law and the currency chaos. Not only large landowners, but owners of small and medium-sized holdings, which represent about 75 per cent. of the cultivated land of Germany, are ceasing to use artificial fertilisers. The result is that workmen are being dismissed, working shifts dropped, and relative costs of production increased, and no improvement is considered likely until pre-war working hours are re-established. The Nitrogen Syndicate, too, announces a considerable reduction in the prices of nitrogenous products, sulphate of ammonia, for example, having fallen from 1.40 gold mark to 1.15 per kilogram of nitrogen. The prices now in force, on the basis of the nitrogen content, are estimated to be about 13 per cent. below pre-war prices, and about 30 per cent. below that of Chile saltpetre.

Points from Our News Pages

Contributed Articles appear on "The Ethics of Professional Advertising" and "The Danger of Specialisation among Chemists" (pp. 30 and 31).

Two papers dealing with analytical methods were read at a meeting of the London Section of the Society of Chemical Industry on Monday (p. 34).

Dr. S. S. Pickles read a paper on recent scientific work in the Rubber Industry (p. 35).

At the Institution of Petroleum Technologists on Tuesday, papers dealing with the oils of Sarawak and Persia were read by Mr. J. Kewley and Dr. A. E. Dunstan (p. 36).

Sir Richard Gregory, in a lecture at the Scientific Novelties Exhibition, spoke on the subject of "Science and Progress" (p. 37).

According to our London Market Report business shows a healthy tendency (p. 46).

There was little business in the Scottish Chemical Market this week, but an improvement is looked for now the holidays are over (p. 49).

The Calendar

JAN.		
14	Institute of Metals (Scottish Section): Open discussion. 7.30 p.m.	39, Elmbank Crescent, Glasgow.
15	Society of Chemical Industry (Birmingham and Midland Section): "The Spontaneous Combustion of Coal." J. Ivon Graham. 7.15 p.m.	The University, Birmingham.
15	Society of Chemical Industry (Edinburgh Section): "Recent Work on Gelatin." Major R. Bruce. 7.30 p.m.	36, York Place, Edinburgh.
15	Mineralogical Society: Papers by A. F. Hallimond, Dr. A. Brammall, Dr. H. F. Harwood, A. Russell and H. C. G. Vincent. 5.30 p.m.	London.
16	Society of Chemical Industry (Newcastle Section): "The Setting of Anhydrous Calcium Sulphate." C. L. Haddon and M. A. W. Brown. 7.30 p.m.	Armstrong College, Newcastle.
16	Society of Glass Technology: Ordinary Meeting. 2.30 p.m.	The College of Technology, Sackville Street, Manchester.
16	Institute of Chemistry (Leeds Section): "The Training of the Chemist." Dr. R. D. Abell. 7 p.m.	Queen's Hotel, Leeds.
16	Institute of Chemistry (Bristol Section): "Some Experiments with Water Finders." Dr. J. Wertheimer.	Merchant Venturers' Technical College, Bristol.
17	Chemical Society: Ordinary Scientific Meeting. 8 p.m.	Burlington House, Piccadilly, W.1.
17	Society of Dyers and Colourists (Bradford Junior Section): Paper by J. Hodgson.	
18	Society of Chemical Industry (South Wales Section): "Routine Work in an Oil Refinery Laboratory." T. D. Ambrose. "Estimation of Sulphur in Petroleum." Dr. H. B. Thompson.	Technical College, Mount Pleasant, Swansea.
18	Royal Institution of Great Britain: "The Scientific Work of Professor Sir James Dewar." Professor H. E. Armstrong. 9 p.m.	Albemarle Street, London, W.1.
18	Society of Dyers and Colourists (Manchester Section): "The Fluorescence of Cellulose." Dr. S. Judd Lewis. 7 p.m.	36 George Street, Manchester.

How Can Consulting Chemists Extend Their Practice?

Unconventional Views on Professional Advertising

The author, frankly disregarding current professional usage, touches on the delicate problem of professional advertising, and suggests a number of ways in which the consulting chemist can extend his practice. The publication of the writer's views does not, of course, necessarily imply agreement with them.

A GREAT part of the success of a consulting chemist is due not only to his own achievements but to the extent to which he can "sell" his knowledge. The sale of knowledge at once prompts the question: How may a consultant secure new clients without violating the ethics of his profession?

The answer to this somewhat delicate question is that a consultant may legitimately obtain additional clients through (1) other consultants; (2) municipal, state, and other public bodies; (3) other clients. From other consultants and clients work comes owing to a good reputation in specific branches of chemical practice. This, undoubtedly, is the most satisfactory channel, though for the ordinary consultant who has not appealed to the popular imagination through some work of outstanding genius or good fortune, such a channel is not opened up in a few months or even years. It comes only from a very wide acquaintance obtained by taking active part in the conduct of scientific societies, by contributing articles to the technical and, sometimes the popular, Press on the specialities with which he is most familiar, and by social acquaintanceship and through common employment.

In spite of the fact that the consultant has been active in a technical society, has contributed to the Press, and is well known to the men of his profession, his name is often totally strange to public bodies. Certainly this is true in the case of smaller authorities. Circular letters and similar advertising matter are sometimes sent out by partnerships of consulting chemists. The percentage of replies is small. I have known circular letters sent out in batches to bring in less than ·5 per cent. of replies. When accompanied by self-addressed envelopes and in normal times the replies have been about 10 per cent, of which 90 per cent. stated that there was "nothing doing." However, some direct results are obtainable.

Press Publicity

News-cutting agencies, advance reports, and similar methods of getting information as to prospective work have been found not to pay for their cost, since the items are usually too late. Articles contributed to the technical Press form one of the most valuable means of reaching the prospective client, whether public officials, private companies or individuals.

Work for private companies is highly desirable, and when once secured as a client the concern seldom makes a change. It is, however, difficult to get advance information from private companies, and much of the work is allotted as the result of acquaintanceship and reputation. Private individuals from time to time have considerable work, but it comes mostly through acquaintanceship, and a considerable amount may be secured through the friendship of other consultants.

It will not pay to ignore any "tip." Nine out of ten are worthless, but the tenth may be very much worth while. A source of work which is quite valuable as the age of a partnership or firm grows is from previous employees, provided they left in good feeling, and retain their respect for the firm.

One of the most important points in acquiring a wider clientele is the character of the work performed. At least 50 per cent. of the clients will have additional work to do after a year or so. In the realm of public bodies this does not mean that the old firm will always be re-commissioned, but if the work has been well done, when the time comes round for new advice the consultant concerned will usually get it without any competition. If friendly relations are maintained with municipal officials they frequently will tell of other work. Various municipalities from time to time have employment for the consulting engineer in such fields as water supply and sewage disposal. They also recommend considerable work of this kind to other public bodies.

No efforts to secure clients will be of any great benefit if they are not followed up by close personal contact. Very little work which is not the result of recommendation by another chemist or another client can be secured purely through correspondence.

One important factor in the "marketing" of chemical engineering knowledge is publicity. While this is not practised to a large extent in Britain, "dignified publicity," consisting of professional cards inserted in the advertisement pages of technical journals, is widely practised in America, and contributes in no small degree to the success of a consulting engineer. This subject is, however, one of delicacy to the majority of engineers.

What is Advertising?

In the first place, what is advertising? Where does personal solicitation leave off and advertising begin? How can the practising consultant get business unless he goes after it in some way? Then what can he do to get business? One way is to tell his friends that he has an office, can carry out certain classes of work, and would like something to do. Probably he (when I say "he" I also include, of course, "they"—*i.e.*, a partnership or firm of consultants) takes a card space or even a small display space in his trade journal. Advertising is, after all, an essential to most businesses, and its effect depends entirely upon the way it is employed.

This brings us to the question—Should the consultant in business for himself advertise? If not, why? Traditions of the profession, custom, practice, and codes of ethics (rather badly worn in places) apparently have drawn a very definite but irregular line between those who may advertise and those who may not. Some think a consultant may publish the fact in the form of an advertisement that he is so-and-so (here a list of degrees), and that he is to be found at such and such an address, but that anything beyond such a plain statement becomes blatant self-praise. Some say they prefer to let their works and their reputation speak for them, but the same men or firms will permit or even encourage the publication of articles describing their achievements. Where, then, can the line be drawn? Why such a distinction between the literary columns and the advertisement columns of a technical journal? The only distinction I can think of is that the literary columns are usually what others say of the firm, while the advertisement pages are what the firm says of itself.

As far as I can see the only objection to an advertisement is when it does not state the truth. If all the subject-matter of an advertisement is strictly accurate what possible objection can there be to its publication? Only the publication of untruth or distorted or exaggerated facts is condemnable. What is there unsavoury, from the ethical or any other view, in such a quarter-page in a technical journal as this?

BEAKER & FLASKE,
Analytical, Consulting, and Research Chemists.
Ferrous, Non-Ferrous, and Rare Metals.

1234 Centrifugal Alley——London, E.C.16.
Telephone—Kingsweigh 5678. Telegrams—"Acidproof."

If Messrs. Beaker and Flaske urged in their advertisement that there were no consultants in the whole of the kingdom to compare with them, and that they should, in the interests of clients, be given preference over all other firms, then their position would become untenable and their commissions inevitably drop off after the first appearance of their advertisement. To my mind it is perfectly logical, ethical, and moral for a consultant to advertise his services.

Would Advertising Pay?

The question, then, would seem to be narrowed down to—Will advertising pay? This is not so easy to answer. In a large number of cases it certainly would not pay. For those who exercised the necessary amount of thought, care, and perseverance it undoubtedly would pay and pay very well. Some consultants can afford to continue in practice until they have built a reputation by word of mouth. But is this the only way? Publicity is not merely buying space and filling

it with type, or sending out circulars. It requires judgment. First, there is judgment required as to the proper periodical appropriations for publicity purposes; then the media to be employed, the method of approach, the selection of the ideas best calculated to produce the desired end, the choice of advertising agency, the style and wording of copy, and the use of illustrations, if any.

If the consultant decides to advertise he should begin with a publication which he believes will best reach his particular clientele, then use that publication exclusively. He might be tempted to spread out his appropriation in the form of very small spaces over a large number of publications, but I do not think this is advisable. The practising consultant or firm of consultants should begin on a moderate scale. They should state clearly the work they are prepared to do, and why they are qualified to do it.

Popular opinion or tradition seems at present to form curious and quite illogical definitions as to who may or may not properly and with professional decency advertise. This feeling will, I am certain, become less arbitrary, and there will in consequence be more opportunity for the consultant to advertise himself. There is also a certain amount of diffidence among consultants about putting themselves forward and making their achievements known. Consequently the layman talks vaguely about "great feats of chemical engineering," as if these were merely phenomena, manifestations of some occult power destined to materialise in the natural order of things, and not the result of self-sacrificing, unstinted application by many chemists to problems affecting the welfare of the community. Effective publicity by chemical engineers would do much to remedy this very unsatisfactory state of affairs and would help to achieve a proper recognition of chemical ability and its value. It would thus be of substantial service to the profession as well as to the individual consultant.

The Danger of Excessive Specialisation
Considered in Relation to Chemical Work

It is an old saying that the more we look at a thing the less we see of it; the state of mind into which we get is well summarised in the simile that we cannot see the wood for the trees. Perhaps this sounds like a statement of the obvious, but it is the obvious that is so seldom noticed; and it is the purpose of this article to comment on the obvious.

The more we investigate any field of human thought or endeavour the more complex does it appear. Its ramifications are seen to be so extensive that to know a tithe of the whole seems well-nigh impossible. The average man, when he has come to this conclusion, thinks it wise to concentrate on becoming acquainted with the details of some sub-division of the whole, in the hope that he may thereby acquire sufficient knowledge of the subject to comprehend it in its entirety. He imagines that though he may not hope to scale the summit at the first attempt, yet he may, by climbing a foot-hill, obtain a somewhat better view of the range. In vain! He cannot see as much as before. The details and problems of the part he has chosen absorb his energies; he is unable to detach himself from its interests and complexities, and soon ceases to wish for the wider vision. He has become a specialist with an outlook necessarily restricted to his own particular problems, and no more than a passing thought for the study as a whole.

The difficulties peculiar to a study might be thought at a first glance to be the fruits of its antiquity; the older it is the greater the number of precedents and laws to be disentangled and memorised. A closer inspection quickly reveals the fallacy of this. The sciences, as they are understood to-day, are young in comparison with the arts; yet the layman can venture to put forward his opinion of a painting or piece of music without fear of making any serious *faux pas*. But he may not similarly criticise a scientific problem. Without a scientific training he would be totally unable to obtain even the remotest idea of the possibilities involved; were he in a position to do so he would no longer be a layman.

The Case of Chemistry

But beside the difficulties besetting the laity wishing to understand a science such as chemistry, there are some preventing specialists in its separate branches from understanding each other's work, and conversely. The expert finds it very difficult, at times, to make clear his meaning to other specialists. Hazlitt's saying that "The chief disadvantage of knowing more and seeing further than others is not to be generally understood," is very applicable. The reason is not far to seek. Chemistry, it is true, is one and indivisible, but its range is infinite. And as it has developed so it has of necessity expanded into many branches, each one like the separate strand of a rope, independent yet all inter-dependent.

During its development every branch has had its own peculiar obstacles to overcome, and the solution of each problem has meant the introduction of fresh technicalities and consequent additions to the vocabulary. Those working together have found it not only necessary to evolve a new nomenclature to fit new substances, but also, practically, a new language to facilitate the more rapid exchange of ideas and results. However advantageous this may be to the smooth and efficient working in the particular branch concerned, it nevertheless presents a stumbling-block to the expert seeking to lay an account of his work before his *confrères* in other branches. They have had to follow the progress of his work from a distance, and consequently, they find that far from understanding his problems they cannot even follow his terminology.

I use the word dialect because it is the only word that adequately describes these "languages," these elaborations of the mother-tongue of chemistry. They have the same functions—they are in common use by small though important sections of the community, like the dialects of Lancashire and Warwickshire—and their existence would appear to be equally inevitable. But unlike the two dialects specified, they may be understood by the application of common-sense, and so should present no great difficulty to the chemist, whose profession is the study of "organised common-sense," as Darwin once called science.

Loss of Perspective

The chemist's early training has placed in his hands the key whereby he may quickly grasp the essentials of any "dialects," and piece together any of the many chemical jig-saws that he may meet. Yet it is surprising how comparatively few chemists with this fundamental knowledge there are, including many of those engaged in research, who have a really sound general knowledge of chemical activities beyond the scope of their own particular branch; very few, indeed, have any working knowledge of recent chemical discoveries and theories. Messrs. Walker, Lewis and McAdam say in the preface to their recently published "Principles of Chemical Engineering": "Experiences have taught us that practising engineers, as well as students, fail to realise the vast amount of useful data that is available in chemical literature." For "engineers" we might well read "chemists." It is no unusual thing to find in reading original papers, though there are always copious references to the work of others somewhat pertinent to the subject matter, that frequently there is no reference to earlier work wherein the same phenomena are mentioned though admittedly not so fully.

There can be only one reason for the existence of such a state of affairs. The chemist has neglected to maintain the general perspective he once had of the science. On the conclusion of his preliminary training the industrial machine forced him to specialise; he could only practise one particular branch of the many he had perceived; and once he had adopted his side-line he found it necessary to concentrate all his efforts upon developing into an efficient unit, with the result that his thoughts became tied to the work in hand. All the blame for his loss of the wide horizon cannot be laid on the commercial system; part of it must be placed on his own shoulders. By keeping himself informed of contemporary chemical literature he could still have preserved a knowledge of its broad outlines. If he would find any satisfaction in chemistry, any æsthetic gratification in his profession, the chemist can only do so by acquiring a wider philosophic vision. As Professor Armstrong says, "Little is done without broad thinking." T. W. J.

Reviews

PHARMACEUTICAL AND FOOD ANALYSIS. By AZOR THURSTON. London: Chapman and Hall, Ltd. 1923. Pp. xiii+416. 21s.

This book, which is typically American in spite of the London address on the title-page, is described in the sub-title as "A manual of standard methods for the analysis of oils, fats and waxes and substances in which they exist; together with allied products." It is divided into nine chapters, which deal successively with "The Polariscope," "The Refractometer," "Specific Gravity," "General Methods of Analysis," "Oils, Fats and Waxes," "Dairy Products," "Flesh Foods," "Eggs and Egg Substitutes" and "Volatile Oils." A foreword by B. L. Murray states that "His (the author's) ideas of the incontrovertible data—the backing needed by chemists engaged in such analysis (*i.e.*, the analysis of foods and drugs)—were born of experience long and intensely practical. . . . The pages of this book contain the very essence of all that others know on the subjects treated. And to the knowledge of others Mr. Thurston has liberally contributed from his own."

After careful perusal your reviewer has come to the conclusion that this work will not be of much value to those chemists engaged in this country in the examination of food and drugs. The Public Analyst is not deeply concerned in the examination of essential oils, and for his purpose the section on this subject may prove adequate, although even here many samples of genuine oils will give results which will lie outside the limits laid down. The other sections, however, exclude much that is of vital importance in recent work, largely because, following the example of other authors, British work is scarcely noticed in the text. The whole of the fixed oil section, including that on dairy produce, is contained in 265 pages, at least 65 of which are taken up with tables and bibliography; the subjects, moreover, receive uneven treatment, as 16 pages are devoted to specific gravity whilst general methods of analysis are dismissed in 26 pages.

In the section on oils, fats and waxes the Reichert-Meissl value for coconut oil is given as 8·42 with a Polenske of 13·1; no mention is made of palm kernel oil or of other oils of the same family, neither has any of the proposed methods of distinguishing between them been included. The work of Sutcliffe and Gemmel on the hexabromide value is not given, the last paper mentioned on this subject being that due to Ingle in 1911. Under arachis oil one looks in vain for Evers' modification of Bellier's process, whilst in another place the medicinal value of cod liver oil is stated to be due probably to *the facility with which it is digested*. The difficult question of cocoa husk is not touched on, the recent work of McLellan and Knapp being ignored.

In the section on dairy products the Reichert, Polenske and Kirschner processes are very shortly described, but in the case of the two latter processes the worker is not cautioned in regard to the need of a carefully conducted blank experiment, although it is stated in a different section that in the case of the Reichert Meissl value a blank experiment should be made in the case of absolute work. As the blank, in the case of a poor sample of glycerin, sometimes becomes as high as 3·0 one would have thought that, even for Americans, a more specific warning than this would have been necessary. No directions are given as to how the Kirschner value should be calculated, whilst the Polenske value is not used in the equation for calculating the percentage of coconut oil in mixtures; the work of Revis, Bolton, Cranfield and others might not have been published.

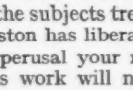
The bibliography is a good feature of the book and will doubtless be useful, but had the work contained therein been incorporated into the text a much more valuable result would have been obtained; but possibly the bibliography has been added later by another hand, as the text shows obvious signs of being out of date. It is supposed to include all papers appearing in English and American journals up to the end of 1921, and the result, which extends to about seventy pages, would seem to be fairly successful. There are a number of errors, however, which apparently indicate that the final revision has been somewhat carelessly done. The following have been noticed: 1971 for 1917, *Evans* for *Evers*, *Richmond* for *Richardson*, *E. S. Shrewsbury* for *H. S. Shrewsbury*, *Canfield* for *Cranfield*, *Boulton* for *Bolton*.

The book is well printed on good paper and is strongly bound in buckram; so well bound, in fact, that it will be quite able to withstand all the handling which it is likely to have in this country.

G. D. E.

THE CHEMISTRY OF UREA. By EMIL A. WERNER. London: Longmans, Green and Co. 1923. Pp. xii + 212. 14s.

This volume, published in the "Monographs on Biochemistry," is the least biological of a biological series. The chapters deal with a historical introduction, and then follow critical accounts of the syntheses, occurrence, properties and relationships of urea, and the constitution of cyanic acid and of salts of ammonia. A number of lecture experiments are included in Chapter 15 to illustrate the contentions in the text; two appendices deal with methods of detection and estimation of urea, its physico-chemical constants, and the fixation of nitrogen in relation to it, whilst an excellent bibliography at the end contains some 280 references.

The book is essentially a thesis in support of the cyclic formula  for urea, as opposed to the carbamide structure traditionally found in text-books. Professor Werner has written it most shrewdly, and in a *tour de force* of argument has not missed a point that is germane. So close and forcible is his writing that a student will be hard put to it to find why the customary formula has been perpetuated, unless it be by the dogmatic weight of perverse authority. It would almost be invidious to comment on any particular section, but the reviewer would wish to call attention to Chapter 13, dealing with the constitution of the salts of ammonia; it is really excellent and most suggestive, and is well worth the careful study of every honours student in chemistry.

At the risk of seeming captious, perhaps a few suggestions might be made. It seems a trifle curt to state, "the existence of the ammonium group NH_4 is purely hypothetical, since all attempts to isolate it have proved futile" (p. 135). A student quite reasonably might have expected some account of the experiments concerned, particularly as the evidence on almost all other points is so detailed. Then again, to say, on p. 123, that "the mechanism of the final generation of urea (from protein in the body) must be the same wherever the seat of its formation," seems to the reviewer rather to dogmatise an unproved assumption. Page 142 certainly suggests, with regard to the ionisation constants of the alkylamines of any given series, that the constant of the trialkyl base is greater than that of the dialkyl, and the latter greater than that of the monoalkyl; whereas, in point of fact, Bredig's figures, in the *Zeit. Phys. Chem.* of 1894 (Vol. 13, pp. 289–326) show that the constant of the dialkyl base is greater than that of either of the other two. Lastly, seeing that the question of urea as an artificial manure has of late years received so much attention, one might have hoped that more space and detail could have been allotted to the patent literature and the commercial possibilities than the two pages devoted to them in the text: in particular, that the paper contributed by Matignon and Fréjacques in *Chimie et Industrie* (1922, Vol. 7, p. 1,057), dealing with this phase of the problem and the plant involved, could have been quoted.

The price of the book might occasion a comment, but it is printed in Britain and maintains the highest standard of workmanship. In this connection the reviewer would wish to pay a tribute to the publishers: after reading every word of this fascinating volume he has only detected one slight misprint in the text, and a few dropped accents in the spelling of French words.

D. IVOR JAMES.

A COURSE OF LABORATORY EXPERIMENTS ON PHYSICO-CHEMICAL PRINCIPLES. By MILES S. SHERRIL. New York: The Macmillan Co. Pp. 125.

This book contains clear and detailed instructions for the carrying out of standard laboratory experiments on physical chemistry. There is no theoretical work in the book, but in the case of each experiment instructions are given as to the method of calculating results, and there is a short discussion on practical or theoretical points. The book is obviously intended for American use, and it is doubtful if it will make any appeal to English teachers or students.

A Comprehensive Treatise on Inorganic and Theoretical Chemistry. By J. W. Mellor, D.Sc. Vol. IV (Ra and Ac Families, Be, Mg, Zn, Cd, Hg). London: Longmans, Green and Co., 1923. Pp. 1,074. 63s.

The presentation of the enormous mass of facts and theories constituting the science of general and theoretical chemistry is to-day a task which might well appear overwhelming to a single mind, no matter how well equipped and assisted by no matter how many hands. Dr. Mellor's monumental work, which is now more than half completed, demonstrates at least that the feat is still possible, though doubtless within a very few years such a task will perforce be left to the encyclopædists. We may differ from the author as to the form a reference book of inorganic chemistry should take, but we have nothing but admiration for the amazing energy and patience with which he has collected together and arranged in due order every available fact germane to the subject.

The present volume, in addition to dealing with the metals named in the sub-title, contains chapters upon the Structure of Matter and the Architecture of the Atom. The theoretical portions are exceedingly readable, being written in Dr. Mellor's well-known, inimitable style and embellished with illuminating quotations (which, published separately, would make quite an interesting philosophic guide for the chemist). One regrets that the book follows so faithfully the author's *Modern Inorganic Chemistry*, for although reference to the purely inorganic portion is easy, it is much more difficult to know where to look for any given theoretical subject. Thus in the present volume the conception of an element given in Vol. I comes up for rediscussion and revision, and in the same chapter additional light is thrown upon the periodic law. The provision of a complete general index may remove a part of this difficulty, but a simpler method would have been to deal with theoretical chemistry entirely separately. After all, this is a book of reference and not a text-book for students, whose introduction to the inner mysteries must be performed with a due regard to the doctrine of reserve.

The inorganic part of the volume is compiled with care and thoroughness. Each metal is treated under numerous sectional headings—History, Preparation and Manufacture, Physical Properties, Chemical Properties, Oxides, various Salts, etc. To each section is appended a list of references (in the case of mercury the references to the physical properties alone cover more than eleven pages of small print!), which are arranged in groups so as to avoid overburdening the text with reference numbers. This system has one drawback in that each statement must include the name of the chemist responsible, and the result is a considerable overworking of such phrases as "according to," "says that," "finds that," "concludes that."

Very few misprints have been noted—on p. 8 the Angström unit is given as a ten-millionth of a metre instead of that fraction of a millimetre; "these" at the bottom of p. 164 should be "three."

An excellent subject index is provided, and the index word is usually to be found in heavy type on the page indicated. The text is well supplied with equilibrium curves and other diagrams, and these are quite properly of uniform size sufficiently large for qualitative comparisons, but necessitating reference to the original papers for quantitative purposes.

C. H.

Clouds and Smokes. By W. E. Gibbs, D.Sc. London: J. and A. Churchill. Pp. 240. Price 10s. 6d.

If the colloidal carbon contained in our winter fogs could be collected we would possess more than sufficient of the finest carbon black in the world to cover the present needs of the British Empire, apart from removing the greatest nuisance of our climate. If the electricity which is condensed in the clouds could be transferred to machinery, a tremendous amount of power would be gained. If all the potash which is contained in the waste gases of some of our industrial furnaces could be separated a huge quantity of valuable fertilisers would be available. The keys to such researches and many other important problems of modern life and technology are discussed in this volume, the tame title of which conveys very little of the valuable material it treats, and the fascinating way in which it deals with these questions. Many processes in connection with gases and vapours find a mention in this book; for example, electrostatic precipitation, and the spray method of evaporation, which are all described with lucidity and exactness. The reader will also be interested in the chapter on "Smoke in Warfare," which shows what influence science has had on this recent development of the terrors of war. The subject is treated in a very simple manner; the number of formulæ is small indeed, considering the character of this book; super-specialised discussions are cut down to a minimum, although any reader with a mathematical mind will find sufficient references to most recent work. In brief, it is a book which should not only be consulted by chemists and physicists interested in these particular investigations, but should be read by everybody who wishes to be up to date.

S. P. S.

Valence, and the Structure of Atoms and Molecules. By Gilbert Newton Lewis. New York: The Chemical Catalog Co. Pp. 172. $3.

Professor Lewis is, of course, one of the chief sponsors of the most recent theories of valence, and this is sufficient to make this book of unusual value. It is gratifying to find that the author handles the subject in a most interesting and personal manner, and is not afraid of including opinions which are in some cases as yet not fully supported by facts. This is really a most desirable feature in a book dealing with a subject which is so new and in a state of flux that ideas are in some cases more valuable than facts, since they may suggest lines of research. It is only necessary to add that the whole treatment is sufficiently simple for the reasoning to be grasped without undue effort by the general scientific but non-mathematical reader.

Handbook of Chemistry and Physics. Compiled by C. D. Hodgman and N. A. Lange. Cleveland, Ohio: Chemical Rubber Publishing Co.; London: Chapman and Hall, Ltd. Pp. 804. Price $4.

The present edition of this handbook is the ninth, and contains in some 800 small pages (about 6½ by 4½ in.) tables and information relating to chemical compounds and their physical constants, electrical tables and numerical tables, such as logarithms, etc. The whole scheme appears to be very completely carried out, and if it errs at all, it is in giving too much rather than too little information. Nevertheless, a work of reference should be comprehensive, and this one should be found extremely useful.

A Course in General Chemistry. By William C. Bray and Wendell M. Latimer. New York: The Macmillan Co. Pp. 148.

This book is an elementary course of chemistry based upon practical laboratory work, much on the lines of similar courses taken in English schools. An interesting point is that the book leads logically up to qualitative analysis, that favourite subject of the examiner. The chief criticism of the book is that it appears to be one of the hundreds written by the practical teacher round his own personal methods, and therefore there are difficulties in its use by those who do not see quite eye to eye with the writer in matters of teaching routine.

Recent Developments in Atomic Theory. By Leo Graetz, translated by Guy Barr. London: Methuen and Co., Ltd. Pp. 170. 9s.

This book is an excellent translation of lectures given in various parts of Germany by Professor Leo Graetz, the professor of physics in the University of Munich. The matter dealt with starts with the development of the atomic theory in connection with the periodic law and the kinetic theory of gases, and is completed by an account of the recent researches which confirm the theory. In the translation, matter has been added to bring the book up to date in accordance with the later work of Aston and Dempster.

Society of Chemical Industry

Methods of Estimating Butyric Acid and Cadmium

Two short papers were read at the meeting of the London Section of the Society of Chemical Industry on Monday, when Dr. Bernard Dyer presided.

The first paper was on "The Estimation of Butyric Acid in Presence of Acetic Acid," by Dr. E. Fyleman, who said that in the examination of fermentation products it was usual to distil the volatile acids after acidification with sulphuric acid or phosphoric acid. The total acidity of the liquid so obtained was then found by titration with standard alkali, using phenol-phthalein as an indicator. The acetic acid in such products was usually accompanied by a certain quantity of butyric acid, the determination of which by ordinary methods was difficult. The determination of the equivalent weight by means of the barium or silver salts did not give satisfactory results, as neutral barium salts decomposed, possibly by hydrolysis, on evaporation of the solution, and the silver salts deposited metallic silver under such conditions. Dr. Fyleman had found, however, that butyric acid could be determined in such liquids with a considerable degree of accuracy by boiling with excess of potassium dichromate in a sulphuric acid solution of definite strength. Under such conditions butyric acid is oxidised to acetic acid and carbon dioxide and reduces the dichromate to the extent of the equivalent of 6 atoms of oxygen. Propionic acid acts similarly, exercising a reducing action equivalent to 3 atoms of oxygen, whilst acetic acid remains almost unattacked. A correction is necessary for the reducing action of the acetic acid, whether originally present or produced by the oxidation of its homologues.

The distillate containing volatile acids is titrated as usual with N/4 NaOH in the presence of a minimum quantity (two drops) of alcoholic phenol-phthalein solution of the usual concentration. It is then boiled down to half bulk in order completely to remove the alcohol from the phenol-phthalein solution, and subsequently diluted to such an extent that 20 c.c. of the liquid correspond to approximately 1 c.c. of N/4 NaOH solution. To 20 c.c. of the liquid, 25 c.c. of N/4 $K_2Cr_2O_7$ are then added in a conical flask of about 300 c.c. capacity, which is then placed under a reflux Liebig condenser; 30 c.c. of concentrated sulphuric acid (96 per cent) are then added through the condenser with shaking, and the liquid is at once boiled for one hour. It is then cooled, diluted to about 250 c.c., and titrated with N/4 thiosulphate solution after the addition of potassium iodide, finally using starch paste as an indicator.

As the reducing action of butyric acid is equal to 6 atoms of oxygen, then, apart from the correction for acetic acid, each cubic centimetre of N/4 $K_2Cr_2O_7$ solution (equivalent to 8 grammes of available oxygen per litre) represents $\frac{6 \times 8{,}000}{88} = 0{\cdot}00183$ grammes of butyric acid. Should propionic acid be present, this cannot, of course, be distinguished from butyric acid by this method, but as the oxygen absorption is proportional to the increased weight of organic acids, the total weight of organic acids is correctly determined, a matter of technical importance.

Determination of Cadmium in Spelter

The second paper was by Mr. C. E. Barrs, and dealt with "The Estimation of Cadmium in Spelter and Zinc Ores." The author pointed out that in the sale of spelter it is often stipulated that cadmium is not to be taken as zinc, and also, if the metal is to be used for rolling into sheet, it is important that the cadmium content, as well as the other impurities present, should be known accurately. In the case of the method of spelter, ten grams of metal are dissolved in 30 c.c. nitric acid and 100 c.c. of water. When dissolved it is diluted to 250 c.c. with warm water and ammonia (0·880) added until the zinc hydroxide precipitate is redissolved. It is then heated to coagulate the remaining precipitate, filtered and washed with a solution of 5 per cent. ammonia. The filtrate is then heated until nearly boiling, and whilst stirring, 2 c.c. of a 50 per cent. solution of sodium sulphide is added. This is repeated with stirring until a small excess of zinc is precipitated. The beaker is then stood on a hot sandbath for an hour with occasional stirring. It is then filtered without washing, the contents of the filter washed back into the same beaker, the filter cleaned with, and the precipitate dissolved in, nitric acid. 15 c.c. of sulphuric acid (1–1) is then added, and the contents of the beaker evaporated to sulphur trioxide fumes. Then 25 c.c. of water are added and heat is applied until all soluble salts have dissolved. Then the beaker is set aside to cool. The precipitate is afterwards filtered off, and washed with 5 per cent. sulphuric acid. Sufficient concentrated sulphuric acid is then added to make the filtrate 20 per cent. acidity, and after warming to 60° C., sulphuretted hydrogen is passed for a few seconds to precipitate most, but not all, of the copper. It is gently heated, and when the precipitate has coagulated, filtered and washed with 2 per cent. sulphuric acid solution. The filtrate is then diluted to at least 250 c.c. with water, and sulphuretted hydrogen passed until the precipitate settles out. If, after passing the gas, for 20 minutes, no precipitate has appeared, one or two drops of ammonia may be added to facilitate the precipitation. The solution is filtered and the precipitate washed with 2 per cent. sulphuric acid solution, containing a little sulphuretted hydrogen. The precipitate is washed back into the same beaker, dissolved in a little nitric acid, evaporated, if necessary, and filtered through the same filter paper into a large previously weighed silicate crucible, and washed with 5 per cent. nitric acid. The contents of the crucible are then evaporated with one c.c. of sulphuric acid (1–1) ignited gently at first, then at red heat, cooled in a desiccator and weighed. A few drops of nitric acid (1–1) and 3 c.c. of warm water are then added to the crucible, and heat applied until any copper oxide has dissolved. This is then titrated for copper by the iodide method in the usual manner. The result calculated to copper oxide and deducted, together with the weight of the crucible, from the above weight gives the cadmium sulphate. The weight of cadmium sulphate multiplied by 0·3591 equals the weight of cadmium.

Method for Zinc Ores

The method for ores is as follows:—two to five grams of the finely crushed ore is attacked with sufficient hydrochloric or nitric acid or a mixture of both to decompose the ore. It is then evaporated to complete dryness, and taken up with 25 c.c. of hydrochloric acid (1–1) and heat applied until all soluble matter has dissolved. The insoluble residue is filtered off, and washed with a solution of 8 per cent. hydrochloric acid. The filtrate is neutralised with ammonia and acidified with hydrochloric acid so that there is one c.c. of acid per 100 c.c. of liquid, sulphuretted hydrogen is then passed until an excess of zinc sulphide is precipitated, after which the beaker is set aside in a warm place for one hour with occasional stirring. The precipitate is filtered off and washed with a solution of ½ per cent. hydrochloric acid containing sulphuretted hydrogen. This precipitate is washed back, into the same beaker, and dissolved in nitric acid, with the addition of a few drops of hydrochloric acid if necessary. When dissolved, ammonia is added in slight excess, the solution heated, and sodium sulphide added, and the analysis proceeded with as in the spelter method.

Dyestuffs Advisory Licensing Committee

The Board of Trade announce that they have appointed, as representatives of users of dyestuffs, Mr. A. Wadsworth, of Messrs. M. Oldroyd and Sons, Ltd., Dewsbury, and Mr. H. Sutcliffe Smith, Chairman of the Colour Users' Association, to be members of the Dyestuffs Advisory Licensing Committee set up under Section 2 (3) of the Dyestuffs (Import Regulation) Act, 1920, in the place of Mr. H. B. Shackleton and Mr. George Douglas, respectively, resigned.

Purified Insulin

It is reported that Mr. P. J. Maloney and Mr. D. N. Finlay, of the University of Toronto, are making progress in their effort to find a system for the purification of insulin extract. Certain elements are being removed from insulin by treatment with charcoal, and by the use of this method insulin may be obtained in a purer state, and, possibly, as a pure chemical substance. It is said that by this means insulin will be reduced in price.

Chemistry in Rubber Manufacture

Dr. S. S. Pickles at the Institution of the Rubber Industry

At a meeting of the Institution of the Rubber Industry held in London on Monday, Dr. S. S. Pickles read a paper on "The Consistency of Rubber and Rubber Compounds." Mr. B. D. Porritt was in the chair. After mentioning briefly the large amount of work that has been done during the past few years on the investigation of the properties of rubber, Dr. Pickles passed on to consider some of these in detail. The first point dealt with was the effect of low temperature. In course of time at ordinary temperatures, raw rubber hardened, and lost its elasticity and transparency. It had been shown by Van Rossem that on warming such hardened rubber the specific gravity changed rather suddenly at about 25°–30° C., and that on cooling again the rubber retained the same properties of elasticity it had before it hardened. In other words, the desired elasticity went together with a lower specific gravity (·917 instead of ·945). Once the chilled rubber had been heated above 25°–30° C it became softened again. There was a possibility in the suggestion that some change resembling crystallisation and solution occurred in these transformations, a fact of considerable interest when the chemical constitution of rubber was under consideration. Bending or working the rubber produced similar results to warming, but this might be due to internal friction between the particles producing heat.

Vulcanising and Softening

Speaking of vulcanisation, Dr. Pickles said that the original idea was that the nature of the final product depended on the percentage of sulphur used, but it was now known that the use of fillers had a great effect. There were active re-inforcing pigments and inactive fillers. Each accelerator had a specific effect on the resulting consistency, and in the presence of accelerators the different forms of carbon, lamp black, gas black, etc., produced approximately similar results. Much depended on the time taken in the vulcanisation process.

The use of rubber softeners was interesting and there was need for a wider range of these. So far the softeners mostly used were mineral and vegetable oils, waxes and resins. Some of these had their influence on the after treatment of the rubber. The theory was that they acted by bringing about the depolymerisation of the molecules; vulcanisation being polymerisation with the assistance of sulphur. A list of the rates of softening of various agents was shown, the most rapid being naphthalene, followed by paraffin wax, down through aniline and many others to palm oil and stearic acid. Linseed oil and castor oil appeared to have no effect. It was interesting to note that organic accelerators were effective in softening as well as in vulcanisation.

Disadvantage of Crystalline Fillers

The "grain" of rubber was an inequality in the elasticity in different directions, produced in calendering the sheet, but the filler had a considerable influence on this. Where crystalline fillers were used, such as magnesium carbonate, graininess was more pronounced than with micro-crystalline fillers, such as zinc oxide or carbon black, which allowed an isotropic sheet to be produced. The shape of the crystals, rather than the size, was considered to be the influencing factor. Under wear, the rubber tended to split along the grain, which was straight with calendered rubber or spiral with forced rubber. In the same connection the property of "knotting" was mentioned, the tendency to form patches, so that when the rubber was torn it did not tend to tear straight along the grain. (The terms "grain" and "knotting" were both taken from analogy with wood.) Knotting was a very valuable property, as it tended to arrest tearing. It was thought to be due to agglomerations of the filler.

Dr. Pickles also gave a short outline of the determination of the resistance to tearing. This had been found to be greatest at the point of optimum cure regarded from the point of view of tensile strength.

A short discussion followed the paper, in which the small amount of scientific investigation so far carried out on rubber was emphasised by several speakers, and the fact was commented upon that this work should have only started recently in such an old-established industry.

French Potash Output

To the Editor of The Chemical Age.

Sir,—In your issue of December 29 last I read with interest an article on Italian potash, concerning which I crave your indulgence for the following remarks.

The world prior to the war was undoubtedly dependent on Germany for its supplies of potash in any quantity, all other sources being, practically speaking, negligible. With the cessation of hostilities, however, the extensive rich deposits in Alsace-Lorraine, previously worked by Germany, came under the control of the French, who rapidly developed the industry as the following figures amply testify. For 1922 the output of the French mines was 1,326,727 tons raw potash salts as compared with 350,000 tons in 1913, when under German control. Again, working only 17 mines the French are in a relatively better position economically than the Germans, who have to spread their output over 211 existing shafts. This can be seen from the export figures in K_2O for 1922, when Germany exported 331,659 tons, or an average of 6,140 tons per mine, as compared with the French export of 158,295 tons K_2O, or an average of 13,118 tons K_2O per mine. These figures show that Germany exported only a little over twice as much as France despite the fact of her having 211 mines as against 17. As at present equipped the French mines can, in addition, increase their output, if necessary, to 500,000 tons K_2O per annum.

The ease with which the potash deposits in Germany and France can be mined and placed on the market at an extremely low cost puts them in a strong position against which other sources of supply have difficulty in competing owing to the necessarily high production costs.—I am, etc.,

Alex. H. M. Moir, B.Sc.

London, January 8.

Income Tax Deductions

To the Editor of The Chemical Age.

Sir,—The seasonable—but none too welcome—demand notes are now being issued and form another of the periodical reminders of the burden of taxation. It cannot be too strongly impressed upon taxpayers that the correctness of the amount demanded should be carefully checked, for it is well known that needless overpayment is commonly made through lack of knowledge of the various deductions, allowances and reliefs.

Some of the more usual deductions, shortly stated, which should be verified to ensure that overcharge is not suffered, are:—Earned income, tenth; personal allowance (£225 married, £135 single, wife to £45 if earning income); children allowance (first £36 and each subsequent £27); housekeeper, £45; widowed mother, £45; dependent relative, £25; first £225 taxable at 2s. 3d.; life insurance premiums, 2s. 3d. to 4s. 6d. per £; wear and tear and obsolescence of plant and machinery, superannuation contributions, expenses wholly and necessarily incurred, employees' earnings on the current year, relief on taxed investment income, reduction if untaxed investment sold, excess property repairs, Building Society interest, Bank or Stockbrokers' loan interest.—Yours, etc.,

W. R. Fairbrother.

67/68, Cheapside, London, E.C.2.

Chemical Industry Films

On Thursday, at the Projecting Theatre of the American Co. (London), Ltd., in Wardour Street, a large company attended a private view of some industrial films in the Federation of British Industries Series. The films shown dealt with "Steel," "Reinforced Concrete," "Heavy Chemicals," and "Coal and its Products," a general outline being given of the raw materials, processes of manufacture, and industrial and other applications of the products. The chemical films dealt mainly with sulphuric acid (illustrated by views of the United Alkali Works) and caustic soda (illustrated by views of Brunner, Mond and Co.'s works). Among those present were Sir Max Muspratt, Sir John Brunner, M.P., Mr. C. A. Hill, Dr. E. F. Armstrong, M. John Grey, Mr. W. J. U. Woolcook, Mr. T. Miller Jones, Mr. E. V. Evans, etc.

Institution of Petroleum Technologists

The Oils of Sarawak and Persia

In a paper read before the Institution of Petroleum Technologists in London on Tuesday Mr. J. Kewley, F.I.C., described the crude oil of Sarawak. This was first worked in 1911 when 170 tons were obtained. In 1922 the yield was 403,394 tons. The oil is of the naphthenic type, but the recent appearance of a paraffin base oil at about 1,950 feet leads one to suspect that, as is the case in East Borneo, wax-bearing oils may be characteristic of the lower levels. The crude is a mobile liquid, reddish brown in colour, and of agreeable odour. It is deficient in fractions of low boiling point. It is free from paraffin wax, and remarkably free from asphaltenes. It has very low viscosity, low sulphur content and yields products which are easily refined.

The elementary analysis of the crude shows the C/H ratio to be high. No attempt has yet been made to isolate any individual hydrocarbons, or even to get any evidence as to the actual nature of the hydrocarbons which make up the bulk of the crude. The difficulty of doing this is only too well known. It is only in the case of the most volatile fractions that there is, so far, any definite information. An examination of a Miri benzine of final boiling point 200° C. showed 5 per cent. of aromatics, the balance being almost entirely naphthenes. A more volatile benzine with final boiling point 150° C. showed aromatics about 2 per cent. and naphthenes about 86 per cent. One still more volatile of specific gravity ·743, and final boiling point 125, showed 1·7 per cent. aromatics and 58 per cent. naphthenes. The practical absence of paraffins, except in the most volatile fractions, is noticeable. Negative bromine and iodine values indicate the absence of unsaturated hydrocarbons, at any rate in the fractions of relatively low boiling points.

Of the chemical composition of the higher fractions nothing is definitely known. From the relatively high specific gravities of the fractions it may be inferred that paraffins are conspicuous by their absence. The heaviest distillates obtained from the fuel oil by steam distillation are very largely soluble in absolute alcohol, a rather unusual phenomenon. They also nitrate readily, giving nitro-compounds which have, so far, not been examined. The behaviour of Miri fuel oil with formaldehyde points to the presence of unsaturated cyclic hydrocarbons, as it was found that the fuel gave a very high formolite test, so that after three successive treatments the oil still gave a precipitate with formaldehyde. On the other hand, the opposite would be inferred from the low iodine value of the oil. It is very evident, therefore, that Miri crude will afford a very interesting field for research.

Treatment of Persian Oils

Dr. A. E. Dunstan, F.I.C., read a paper describing the crude oil from Maidan-i-Naftun, which presents a number of interesting points in its refining. Like most Persian oils there is a high percentage of sulphur compounds. These are removed from the once-run distillate, but the process has presented some technical difficulties. This has now been conveniently accomplished by means of the hypochlorite process of refining.

In this process (British Patents 139,223/18, 184,281/21, 204,078/22) the distillate is first washed with a 10 per cent. solution of caustic soda. The preliminary alkali wash removes hydrogen sulphide and sulphur dioxide, and organic sulphur compounds of an acidic nature; the greater part of the latter are only feebly combined with the soda and can be removed by boiling, thus rendering the soda available for further use. The compounds removed by the soda wash have a most objectionable odour, but the treatment effects only a partial removal, and the naphtha still possesses an unpleasant odour, although upward of 20 per cent. of its sulphur content has been eliminated if the naphtha is fresh; a less amount is removed from a stale distillate.

The oil is now treated with a solution of sodium hypochlorite (0·2-0·3N) (obtained by the electrolysis of brine). It is important that this solution should contain free alkali equivalent to about ·5 grms. of caustic soda per litre. If free alkali is not present the solution is too unstable, and slight chlorination of the hydrocarbons may result, as well as oxidation of the sulphur compounds, whilst the presence of more than 1 grm. of caustic soda per litre renders the hypochlorite almost inactive. This treatment, which takes from half an hour to an hour, reduces the sulphur content by approximately another 20 per cent., and completely utilises the available oxygen of the hypochlorite. A second similar treatment is now given, but a longer time is necessary for the hypochlorite to become exhausted; when the concentration falls to about 0·03N the operation is complete.

Activated Charcoal

The "cracking" of Persian oil gives very satisfactory results. A vapour phase process developed to deal primarily with Persian gas oil has given peculiar results. In this method of treatment gas oil vapour is cracked within the pores of activated charcoal, the underlying idea being that when absorbed into the charcoal or other agent the vapours are under high-adsorbed pressure. Cracking takes place and the light products are replaced by incoming heavier vapours. The gasoline obtained by this method, without any refining whatever, possesses a smell almost identical with that of a straight run gasoline, and does not deposit gum on keeping. Moreover, the residue from its distillation up to 200° C. consists very largely of almost pure naphthalene, which solidifies in the distillation vessel. Whether the naphthalene is produced synthetically under the conditions of the treatment, or by dehydrogenation of hydronaphthalenes originally present in the gas oil is not yet clear.

An interesting point about the lubricating oil fractions is that in the ultra-microscope they are clearly seen to be two-phase systems and characteristically fluorescent; whether all such distillates from any source are colloids or not is open to question. Possibly these oils are isocolloids as described by Ostwald. The result of the examination of a large number of lubricating oils in this way would be of considerable interest in the attempt being made to elucidate the nature of oiliness.

It may also be noted that the final residue or ash exhibits a small degree of radio-activity, 15 grms. of ash showing about two-thirds of the activity of ·1 grm. of uranium nitrates when tested by the usual method.

Note Books and Calendars for the New Year

Among the calendars we have received is a large wall calendar suitable for offices from W. H. Willcox and Co., Ltd., of 38, Southwark Street, London, S.E.1, which shows a month at a time, and is embellished with illustrations of a variety of the engineers' sundries, such as valves, belts, oils, etc., supplied by the firm. Sutcliffe Bros. and Bryce, of Hyde, have sent a useful and very attractive leather-bound pocket diary of the convenient size of about 6 by 4 ins. This contains only one announcement of the firm's specialities (boiler and pipe coverings) and so is commendably free from advertisements. Thomas Broadbent and Sons have issued a handy little loose-leaf vest-pocket note-book, for rough jottings, a feature of which is the celluloid cover illustrating their centrifugal clutch pulleys.

A useful idea has been adopted by James Mellis and Co., soap makers, of Prestonpans, in the form of a desk calendar of the daily memorandum type, in which each day the date is clearly shown, and there is a good space on the pad in front for making notes. In addition, the name of the firm is always before the eye of the user. The London, Midland and Scottish Railway have issued an artistic wall calendar, the illustration on which is by Mr. E. Whatley, and shows a scene on the "L.M.S." line, with an express train painted in the latest style.

Grasselli Company's Successful Dye Suit

In a final decree in the United States District Court, New York, the Commonwealth Colour and Chemical Co. has been ordered to desist and refrain from directly or indirectly infringing on dye patents owned by the Grasselli Chemical Company. The suit of the Grasselli Chemical Co. was instituted for the infringement of dye and pharmaceutical patents seized by the Government from the Bayer Co., sold to the Sterling Chemical Co., and later split up in a sale which brought the dye patents to the Grasselli Co. The colours involved were Algol Brilliant Violet BB powder, Algol Red Extra powder, Benzo Fast Heliotrope 4 BL, Diazo Fast Yellow 2G, Alizarin Uranole 2B, and Diazo Fast Green GF. The suit was brought under the Tariff Act of 1922, section 526, which invests Federal authorities with the power to prevent infringement of trade-mark rights in importation.

Utilisation of Scientific Discoveries

Sir Richard Gregory at the Scientific Novelties Exhibition

SIR RICHARD GREGORY, lecturing on Wednesday at the Scientific Novelties Exhibition at King's College, London, on the subject of "Science and Progress," said that during the last fifty years there had been more scientific discoveries and applications than in the whole previous history of the human race; and we might be on the threshold of developments by which forces would be unloosed, and powers acquired, beyond what had hitherto been known to man. Whether these should be used to promote social well-being and international amity was not a question for science, but for the public and its leaders. While nations looked to war as the ultimate means of deciding disputes, they would seek to possess themselves of the most powerful means of imposing their wills upon others. As Professor Soddy recently remarked, should it be possible ever to release the great store of energy in the atom, the first use that would be made of it would be to construct a new bomb.

Modern civilisation was built upon science, and almost all industrial developments had their origin in principles or substances discovered in scientific laboratories by investigators working purely for the advancement of natural knowledge. The principle that a moving magnet could create a current of electricity in a coil of wire near it, discovered by Faraday nearly a century ago, led to the construction of the dynamo, and was the seed from which the great industry of electrical engineering had grown. It was estimated that this industry now represented a capital of more than one thousand million pounds, and it could not have existed without the discovery by Faraday of the fundamental principle of all electro-magnetic machinery. All the pure copper required for this machinery and electrical purposes generally was produced by electrolysis, and here again the principles used were discovered during scientific investigations by Davy and Faraday.

The Value of Rare Elements

The metal tungsten used for the filament of electric bulb lamps and thermionic valves was scarcely known outside scientific laboratories a few years ago. It was discovered about 1785, but its uses were not understood until nearly a century later. It was an essential constituent of high-speed tool steels, which required to be not only extremely hard but also to maintain their hardness at high temperatures, even at an incipient red-heat. Tungsten steel was also used for the permanent magnets of telephones and the magnetos of every motor car and aeroplane. Thorium and cerium, used in the manufacture of incandescent gas mantles, of which about four hundred millions were made annually, were products of the chemical laboratory many years before they gave rise to a large industry; and even the air-burner itself used for such mantles and in all gas fires was first devised and used by Bunsen for laboratory purposes.

When argon was isolated from the air in 1895, no one regarded the discovery as of any practical importance, yet the gas was now used in half-watt and other gas-filled electric lamps as the most suitable for the purpose. Neon, isolated from the atmosphere a little later, was widely used for the brilliant pink glow lamps of illuminated advertisements, particularly in Paris, where it was a by-product of the manufacture of liquid air. Probably the most remarkable example of this kind was afforded by the gas helium, which was detected in the sun by Lockyer and Janssen in 1868, twenty-six years later was extracted from cleveite by Ramsay, and was now produced to the extent of thousands of cubic feet daily from natural gas wells in the United States for the inflation of dirigibles and other air-ships. As it was non-inflammable and non-explosive it had decided advantages over hydrogen for this purpose and was only slightly heavier. Before things could be used in any way they must be discovered, and it was the particular function of science to reveal them. It was the business of the scientific investigator to discover, of the engineer or inventor to recognise and apply the results achieved, of the artisan to employ his skill in making them commercially profitable, and of the community to see that they were used to promote social welfare. If the world had not been made any happier by what science had given to it, the fault was with the human race itself and not with science.

Dr. C. H. Herty's European Impressions

Chemistry a Creator of New Wealth

ADDRESSING the Montreal Section of the Institute of Chemistry, Dr. C. H. Herty, who recently visited Europe, referred to a number of British chemists whom he met in London and in Paris, many of whom were well known to the gathering as visitors two years ago. He endorsed the French stand on reparations: he had been in both France and Germany just after the war, and the contrast between the devastated regions and the untouched soil of Germany had made him an advocate of making Germany pay to the limit. France was frequently accused of being militarist; but on his recent visit he found the French working hard at reconstruction, and the main question which was discussed by the chemists present at the Third International Congress of Applied Chemistry was the application of chemistry to agriculture. There is much talk at present throughout the world of the transfer of existing wealth; but chemistry was an agent which created wealth from undeveloped or hitherto wasted materials. Big and small business institutions were coming more and more to realize that in such matters as the testing of supplies, the perfecting and superintending of manufacturing processes and the elimination of waste, the services of the trained chemist were invaluable, for he substituted scientific certainty for guess-work or rule-of-thumb methods. The actual creation of value and wealth was well exemplified by the production of calcium carbide from lime, coke and electric energy. The chemist took those three raw materials, of relatively small value, and transformed them into a much more valuable product, which was but the first step in the production of numerous products of even greater value, such as acetylene, acetaldehyde, acetic acid, etc. Another instance was the phosphorus industry of the south of the United States, which transformed phosphate rocks into products which had about 24 or 25 times the value of the raw material. Other instances were given along these lines, all tending to show the value of the work of the chemist to the prosperity of a country. Dr. Herty emphasized the necessity of popularising chemistry, that is, of making the mass of the people familiar in a general way with its potentialities. In order to be successful this must be done as an educational proposition for the good of the nation, and not as propaganda for the chemists. Dr. Herty was asked to represent the Montreal Section in New York on the occasion of the presentation of the Perkin Medal for 1923 to Dr. F. M. Beckett, a native of Montreal, and a graduate of McGill University.

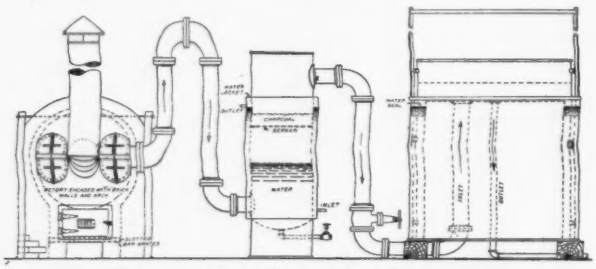
Ramsay Memorial Laboratory

IN connection with the establishment at University College, London, of the Ramsay Memorial Laboratory of Chemical Engineering, the newly appointed Professor, Mr. E. C. Williams, M.Sc., will deliver a public inaugural lecture at University College on "The Aims and Future Work of the Ramsay Laboratory of Chemical Engineering," on Thursday, January 17, at 5.30 p.m. The chair will be taken by Sir Robert Robertson, who has been closely associated with the establishment of the laboratory, and is chairman of the Chemical Engineering Sub-Committee. The lecture will be open to the public, and application for tickets should be addressed to the secretary of University College. The establishment of a Ramsay Memorial Laboratory of Chemical Engineering at University College, London, was one of the two main objects of the fund raised in memory of the late Professor Sir William Ramsay. The committee of the Ramsay Fund found it possible to hand over to the University for University College a sum of approximately £27,000. The laboratory has been instituted in the first instance for an experimental period of five years, and a suitable building in Gordon Street, close to the Chemistry Laboratories, has been reconstructed and equipped so as to be available for the work of the new laboratory. A number of firms interested in the chemical and chemical engineering industries have promised annual subscriptions for a period of five years, totalling £1,540 a year, or have given single donations amounting to £206 for the promotion of this new development in chemical teaching. A leaflet giving particulars of the proposed work of the Laboratory of Chemical Engineering can be obtained from the Secretary, University College, London (Gower Street, W.C.1.).

The Utilisation of Straw

Experimental Production of Straw-Gas

AN interesting investigation has been carried out by the United States Bureau of Chemistry on the practicability of using straw-gas for power and heating purposes in small farms. Although the manufacture was found to be impracticable on the ground of expense, from the point of view of power production, heating and lighting the gas proved satisfactory. A report has just been issued by the U.S. Department of Agriculture* describing the experimental plant. The plant consisted of a cylindrical steel retort, a steel scrubber and condenser combined, and a steel water-sealed gasometer. In experimental runs about 50 lbs. of unbaled, sun-dried straw were placed in the retort, and the heat applied by burning straw or other fuel in the firebox. The charge was carbonised in 30–45 minutes. The gas began to come off at 200° C., maximum production being at about 500° C. Very satisfactory gas was obtained from wheat-straw, oat-straw and corn-stalks. A ton of sun-dried straw gave approxi-



EXPERIMENTAL STRAW-GAS PRODUCER

mately 1,000 cu. ft. of purified gas, 625 lb. of carbon residue, 10 galls. of tar and a large quantity of ammoniacal liquors. Below is the average analysis of the gas, which has a heating value of about 400 B.Th.U. per cu. ft.

Composition of Gas from Sun-dred Wheat-straw.

	Per cent.
Carbon dioxide (Co_2)	30.0
Carbon monoxide (CO)	26.0
Hydrogen (H_2)	26.0
Methane (CH_4)	15.0
Illuminants (Ethylene, C_2H_4, etc.)	1.5
Nitrogen (N_2) (by difference)	1.0
Oxygen (O_2)	.5
	100.0

Straw-gas burns with a beautiful blue flame in a Bunsen burner. It produces a very satisfactory light in a mantle lamp and has good heating value. It is also very satisfactory for operating stationary internal-combustion engines, giving the best results when admitted to the explosion chamber with the addition of but little air and ignited under a compression greater than that found in the ordinary type of farm engine. The gas is practically colourless, but has a slight odour. The presence of a fairly high percentage of poisonous carbon monoxide in the gas makes advisable some care in its production and utilisation.

There is apparently practically no market for the by-products from destructive distillation of straw, the most satisfactory method of disposing of the carbon residue being to use it as a fertiliser on farms where grain is produced, otherwise the cost of transport is out of all proportion to the value of the product. As a fertiliser the average composition is about 5 per cent. K_2O, 1·5 per cent. NH_3, and 0·3 per cent. H_3PO_4. The tar can be used as a wood preservative and a disinfectant.

Working Costs Too High

As a result of the record of costs kept during the experimental work the Department concluded that the type of straw-gas producing plant used was not practicable as a unit for farms, chiefly on account of its first cost and upkeep, the length of time required to produce suitable quantities of gas, and certain inconvenient features in the retort and scrubber, which last might be modified, however. On the basis of heating units produced, straw-gas, as a fuel for heating, cooking, and stationary power purposes, costs at least 1 cent (about ½d.) per 1,690 British thermal units. Wood selling for $10 a cord, sawed and split, costs 1 cent per 18,000 British thermal units; anthracite coal at $15 a short ton costs 1 cent per 16,335 British thermal units; bituminous coal (high grade) at $14 a short ton costs 1 cent per 19,430 British thermal units; gasoline at 25 cents a gallon costs 1 cent per 4,320 British thermal units; and kerosene at 18 cents a gallon costs 1 cent 7,110 British thermal units For lighting purposes it is stated that the cost for farms is about half as great again as that of electricity supplied from an individual lighting plant.

In these calculations no charge has been made against the straw consumed, no monetary value has been given the by-products, and no consideration has been given to hauling charges, or to the cost of a building for housing the equipment. The heat for carbonising the charge was supplied by straw burned in the firebox. Straw, though generally wasted, has a distinct potential value by virtue of the fertilising constituents which it contains. According to figures taken from accurate analyses, with nitrogen selling for 25 cents, phosphoric acid for 8 cents, and potash for 15 cents a pound, oat-straw has a value of $7.73, barley-straw one of $6.68, wheat-straw one of $4.95, and rye-straw one of $5.25 a ton. It would be necessary to pay these prices to obtain the same quantity of fertilising consituents in commercial fertilisers. Accordingly, straw when returned to the soil for the addition of plant food elements is very valuable; and this would seem to be the most practicable way of utilising straw under present conditions. Any change which tends to decrease the expense of manufacture or enhance the value of the main product and by-products would, of course, increase the attractiveness of the proposition, but whether this would be of a magnitude to make it a financial success is doubtful. On the other hand, the use of this gas would afford many advantages and conveniences which could not be measured in hard cash.

*U.S. Department of Agriculture. Washington, D.C. Bulletin 1,203.

Hardness and Atomic Structure

Sir William Bragg's Concluding Lecture

SIR WILLIAM BRAGG, in completing the course of his lectures on "The Nature of Things" at the Royal Institution, London, brought out a number of interesting points. Speaking of diamonds, he said that X-rays had shown that the structure of the diamond was of extraordinary simplicity. Every carbon atom in a diamond had four others spaced symmetrically around it. A diamond was hard because every atom was so beautifully placed that it was difficult to displace. Thus a diamond could be used as a tool to cut other substances. The structure of graphite, or black lead, was derived from that of the diamond by a simple change which weakened one of the four ties which bound each carbon atom to its neighbours. Graphite then broke up easily into flakes, which, while individually firm, slid easily on one another, and that was how it was possible to use, as a lubricant, a substance derived from that hardest of stones, the diamond. In the diamond, too, could be found the rings of six carbon atoms which formed the basis of benzene.

The Properties of Metals

Metals formed crystals when they soldified, as everything else tended to do. Usually the crystals were of a simple character, but became complicated in the case of alloys. The metallic atoms were those which readily parted with one or two electrons. This was the secret of all their properties. When a metal solidified, the atoms arranged themselves; generally in the form taken by a pile of balls packed as tightly as possible. The odd electrons acquired a certain freedom of movement in and out of the interstices between the packed atoms; and for that reason a metal was a conductor of electricity. Much appeared to depend on the perfection of the arrangement of the atoms because a little impurity reduced the conductivity materially. When the electrons came to the surface of a metal in their wanderings they might be hurled off into surrunding space like the atoms or molecules of an evaporating liquid. When a wire was red hot the outflow became quite large; and this fact was made use of in the

famous "valve" which had made wireless telegraphy and telephony so practicable.

The structure and properties of a metal depended greatly on its state of crystallisation. It was not often that they found a piece of metal to consist of one large crystal, though such crystals could be obtained by careful treatment. It was better that a metal which was to be used to stand general stresses should consist of a mass of smaller crystals arranged in every direction, so that the element of weakness was removed. An alloy might be stronger than a pure metal because the introduction of stronger atoms into the crystal of the original metal spoiled the easy slip of the crystal planes over one another in the weak direction, just as nails in one's shoes prevented slipping on muddy ground. That was why bronze was such a great advance on pure copper.

When a metal was worked with hammers or rolls the lie of the crystals was altered, the new situation generally involving more strain. Thus a copper sheet became harder when it was beaten, and must be annealed before work could begin again. Once a cutting edge was prepared there were two stages to be gone through. In one the metal was ground away and furrows were ploughed into the metal. In the second stage the metal was made to flow, as Sir George Beilby had shown, the furrows were filled up and holes were covered over. Metal working was so old and so important that the processes of manufacture had gone far ahead of complete theoretical explanations. Yet the microscope had in recent years helped them to catch up to some extent, and made it possible for science to help with the processes of the metal industries. They might hope that the still keener insight of the X-ray might be able to give still more knowledge and assistance.

American Chemical Society's New President

Dr. Leo Hendrik Baekeland, internationally known for his invention of bakelite, and honorary professor of chemistry in Columbia University, has been elected president of the American Chemical Society for 1924.

Dr. Baekeland, who suceeds Professor E. C. Franklin of Leland Stanford University, is described as one of a group of leaders whose triumphs mark an era in the progress of American science and invention. He was born in 1863 at Ghent, where he received his early education. When twenty-one he became a Doctor of Science, and later was appointed assistant professor, and in 1889 associate professor at the University of Ghent. Winning, among other prizes, a travelling scholarship in chemistry, he was enabled to visit universities in England, Germany, and Scotland, and to make a trip to the United States in 1889. Before leaving Ghent, Dr. Baekeland had become interested in photography, and soon after reaching New York he decided to accept a position as chemist in the manufacture of photographic films and bromide paper. Later he became a research chemist, and began at Yonkers, N.Y., the manufacture of a photo printing paper (Velox), which he had worked to perfect as far back as 1882 while he was still a student in Ghent. Discovery of this process made Dr. Baekeland a leader in the development of the photographic art, and he finally sold his entire enterprise to a company. Dr. Baekeland next turned his attention to electro-chemistry. He spent a winter at the Technological Institute at Charlottenburg, near Berlin, in the electro-chemical laboratory, and on his return to America equipped a private laboratory at Yonkers. He undertook direction of the work preliminary to the industrial development of the newly invented electrolytic cell for producing caustic soda and chlorine from salt. The result was the establishment at Niagara Falls of one of the largest electro-chemical plants in the world. Dr. Baekeland entered upon the task which resulted in the production of bakelite.

Dr. Baekeland was awarded the Nichols Medal of the American Chemical Society in 1909, the John Scott Medal of the Franklin Institute in 1910, the Willard Gibbs Medal of the Chicago Section of the American Chemical Society in 1913, the Chandler Medal of Columbia University in 1914, the Perkin Medal for Industrial Chemical Research in 1916, and the grand prize of the Panama-Pacific Exposition in 1915.

German Nitrogen and Potash Industries

Decline in Potash Production

The *Industrie und Handels Zeitung* of December 25, in an extract forwarded to the Department of Overseas Trade by the Commercial Secretary at Berlin (Mr. J. W. F. Thelwall), gives the following statement on the potash industry which was made at a meeting of the German Potash Syndicate on December 18:—

"While June of this year was the best sales month ever recorded by the industry and orders of German agriculture were still satisfactory also in July, a bad stagantion in inland sales set in in September. This was at first attributed to the precipitate tax legislation and to the method of collection, and later to the currency chaos. Agriculturists refused, not unjustly, to sell their products against paper marks, and the stable money which was promised, in the first place, to agriculture for the delivery of cereals was not forthcoming. The issue of the Renten Mark and the discount in kind which the Potash Syndicate granted during November called forth a temporary revival of business, which, however, again came to a standstill immediately the provisions of the new Property Tax became known. It is unfortunately the case that small and medium-sized agricultural undertakings, which cultivate more than 75 per cent. of the soil in Germany, have almost ceased to apply artificial fertilisers to their land, and that substantial restrictions in this respect have also been effected by large landowners. As a result, it is to be feared that the taxes will involve a great decline in production. The critical conditions on the market during the last five months have compelled the potash industry to drop shifts everywhere and to dismiss hands. As a result of the decline in sales and of the consequent necessity of restricting operations, the costs of production have increased. No improvement can be anticipated without a substantial increase of production, which, again, is only possible if pre-war working hours are reintroduced. Further, it is feared that the spring trade also will be affected by the position of agriculture, the products of which at present fetch considerably less than the pre-war prices. Foreign trade was satisfactory, and the percentage of foreign sales to inland sales showed an important rise in 1923. The taking over of new works and the raising of the original capital has been postponed. A meeting of the Reich Potash Council has been arranged for January 4, 1924, at which an application of the Potash Syndicate for a reduction or re-fixing of prices as from January 1 will be considered."

Reduction of Nitrogen Prices

The Commercial Secretary at Berlin (Mr. J. W. F. Thelwall) has forwarded to the Department of Overseas Trade an extract from the *Berliner Tageblatt* of recent date which gives the following statement issued by the Nitrogen Syndicate:—

"Corresponding with the approximation of the gold mark to the foreign gold value, prices have fallen in many branches of industry. The consequent effect on the costs of production has enabled the Nitrogen Syndicate to make a considerable reduction in prices; *e.g.*, sulphate of ammonia has been reduced from 1.40 to 1.15 gold marks per kilogram nitrogen. The following is a list of the new prices which are applicable as from December 20:—

	Gold M.	
Sulphate of Ammonia	1·15	per kg. nitrogen
,, ,, ,, dried and ground	1·17	
Chloride of Ammonia	1·15	
Leuna Saltpetre	1·15	
Potassium Nitrate of Ammonia.. ..	1·15	
Nitrate of Lime	1·10	

The price now in force for nitrogen is about 13 per cent. below the pre-war price and about 30 per cent. below that for Chili saltpetre.

Russia Adopts the Metric System

It is reported from Moscow that the Commission for the introduction of metric weights and measures in the Russian State co-operative societies and the private enterprises has fixed the dates on which the new system will come into force: in the case of chemical products this is to be July 2, and for salts, August 1, 1924. These dates apply to trade in the above articles; in industry the metric unit for all these goods came into force as from January 1.

Mineral Production in Canada

Prices on a Pre-War Level

THE Canadian Dominion Bureau of Statistics has recently issued a preliminary report on the Mineral Production of Canada during the six months ending June 30, 1923. The report states that, measured in terms of the metallic and non-metallic mineral output and excluding structural materials and clay products, the mineral production of Canada during the six months under consideration was valued at $87,152,248, as compared with $60,361,109, the value of the corresponding production in the first six months of 1922. The output of these commodities during the twelve months of the calendar year 1922 was valued at $144,762,501, so the records for the present year show that an appreciable advance has been made both in relation to the output in the first six months of 1922 and also to the entire calendar year.

The outstanding feature of the metal industry during the first six months was the recovery in the production of nickel and copper. The reopening of the smelters and refineries operated by the International Nickel Company and the British America Nickel Corporation resulted in a production of nickel during the first six months of the year which was nearly seven times greater than the production in the first half of last year, and the output of copper was more than double the quantity produced in the corresponding period last year. The copper output during the half-year was greater than the total production during the calendar year 1922; the nickel output was also nearly 60 per cent. greater than the entire quantity made during the twelve months ending December, 1922.

The production of gold and silver was maintained at about the same levels as in the corresponding period in 1922, while the outputs of asbestos, coal, lead and zinc were higher than in the first half of 1922. Shipments of gypsum, while less in amount, were greater in value, and while the output of salt declined the quantity sold was greater than in the half-year ending June 1922.

An interesting situation is reflected in the price indexes of metals, etc., compiled by the Internal Trade Branch of the Bureau. Taking the average price for 1913 as a base of 100 the index for non-ferrous metals during the period under review stood at 99·9 in January, 97·8 in February, about 102 during the next three months and 101·4 in June. That is to say the average prices of non-ferrous metals in Canada during the first six months of 1923 were almost identical with the prices prevailing for these commodities in 1913. Non-metallic minerals on the other hand showed an average of approximately 85 per cent. in excess of the 1913 average. The non-metallic group includes such materials as coal, brick, lime, cement, glass, petroleum, pottery, sulphur and salt, etc. Iron and steel prices showed a greater fluctuation than either of the other two groups mentioned and ranged from 157·3 in January to a maximum of 171·5 in June, the advance being gradual and continuous throughout the period. Mineral prices as a whole advanced slightly during the period and were maintained, at an average of between 55 and 60 per cent., above the prices prevailing in 1913.

Copper and Nickel

The reopening of the nickel-copper smelters and refineries resulted in a very greatly increased production of nickel and copper. The total production of copper in Canada during the six months ending June was 44,729,386 lbs. which, at the average New York quotation for electrolytic copper of 15·577 cents, was valued at $6,967,496. The entire production during the twelve months ending December 1922 was 42,879,818 lbs., of which amount 17,941,755 lbs. was produced during the first six months of the year.

Of the production during the first half of this year 16,100,000 lbs. was contained in blister copper, all of which was exported to the United States for treatment; 14,504,902 lbs. was contained in nickel-copper matte produced at Sudbury, some of which was exported and some refined in Canada; 28,484 lbs. contained in copper sulphate; and 15,150,000 lbs. the estimated recoveries from ores, concentrates and residues exported for treatment.

No refined copper was produced during the period in Canada. The copper smelters and refineries of the Consolidated Mining and Smelting Co. were not in operation. An interesting feature of the Canadian tariff changes was the provision for a bounty of 1½ cents per pound on copper bars and rods produced in Canada. It is thought that this bounty will prove distinctly beneficial to this branch of the industry.

The depression in the markets for nickel caused by the discontinuance of the demand for this metal as a war material which has prevailed during the past few years apparently came to an end early in the present year and the renewal of activities by the International Nickel Company and by the British America Nickel Corporation resulted in a production of nickel amounting to 27,071,326 lb. during the first six months of the present year. The output included 26,885,545 lbs., contained in nickel-copper matte made by the Canadian smelters treating Sudbury ores and 185,968 lbs., the nickel contents of smelter products resulting from the treatment of silver-cobalt ores. At the average New York price of 31·130 cents per lb. for 99 per cent. virgin metal the output of nickel was computed to be worth $8,427,335.

Arsenic Production

The production of arsenic in Canada during the half-year ending June 30, 1923, amounted to 1,413 tons valued at $298,396. The smelting of silver-cobalt-nickel ores of the Cobalt district and the recovery from the arsenical gold concentrates shipped by the Hedley Gold Mining Company in British Columbia to the Tacoma Smelter accounted for the output. The average price of white arsenic during the half-year was 12·5 cents per pound as compared with the average price of 7·21 cents a pound which prevailed in the first half of 1922 and an average of 8·5 cents per pound for the calendar year. This commodity is generally marketed in the form of arsenious oxide (As_2O_3). It is used principally in the manufacture of insecticides such as paris green and lead arsenate, although there is a considerable quantity consumed in the glass and tanning industries. Trade records show exportations of arsenic during the half-year as follows: white arsenic, 602 tons at $153,653; metallic, 27 tons valued at $4,744.

Imports and Production of Soda Compounds

Sales of sodium sulphate during the first six months of 1923 totalled 66 tons with a value of $1,268. As in previous years these shipments were made from the natural deposits of sodium sulphate in Saskatchewan. The imports of salt cake during the period amounted to 16,899 tons valued at $364,378, a decrease of nearly 600 tons over those of the first six months of the previous year.

Death of a Physiological Chemist

THE death of Professor H. J. Hamburger was announced at Groningen, on Saturday, January 5. Dr. Hamburger, who had been Professor of Physiology in the University of Groningen since 1901, was a pioneer in the application of physical chemistry in the medical sciences. In 1902–4 he published an important work on osmotic phenomena in relation to physiology containing the researches made by himself and others. In 1908, the 25th anniversary of his doctorate in chemistry was celebrated by the publication of a book containing numerous contributions on biochemistry by European and American scientists. Professor Hamburger presided over the ninth International Physiological Congress at Groningen in 1913. In 1922 he was the first Charles E. Dolme Lecturer at Johns Hopkins University, Baltimore, and Herter Lecturer, New York. Professor Hamburger, who attended the meeting of the British Association at Dundee in 1912, received the hon. degree of LL.D. of St. Andrews and Aberdeen.

Welsh Anthracite Combine

THE Amalgamated Anthracite Collieries, Ltd., popularly known as the "Mond Combine," have acquired the Cawdor and the Coomdorse collieries in the Amman Valley as and from December 29, 1923. The purchase price of the undertakings totals roughly £500,000. Sir Alfred Mond, when in Swansea over the general election, was engaged in negotiations for the purchase, and it is understood that terms were then provisionally arranged. Both collieries are in the anthracite field, and together they employ about 600 men. The Cawdor is the larger of the two collieries and the combined output is about 750 tons per day. The vendor was Sir Beddoes Rees of Cardiff. The "Mond Combine" now includes the following eight collieries:—Tirydail, New Cross Hands, Llandebie, Dellybedrim, Cryant, Gurnos, Cawdor, and Coomdorse.

From Week to Week

MR. AND MRS. ROBERT MOND have changed their address from 7, Cavendish Mansions, to 9, Cavendish Square, London, W.1.

A FERTILISER MILL at Landskrona, Sweden, was partially destroyed by fire on Monday. The damage is estimated at 2,500,000 kroner.

OUT OF 39 American firms which paid extra dividends in November, eleven were manufacturers of dyes, chemicals, and allied products.

THE DEATH is announced of Mr. John Samuel Harrison, late of the Birmingham Metal and Munitions Co., Ltd., at Erdington, on Wednesday, January 2.

MR. THOMAS MAUGHAN, whose death occurred on Monday, was a partner in the chemical manufacturing firm of Pattison and Co., South Shore, Gateshead.

A NEW TEXTILE FIBRE, known as Fibraso, is reported to have been developed in Brazil. It dyes well and easily takes up sizing materials and finishing chemicals.

DR. W. F. FARAGHER, well known as a specialist in the chemistry and technology of petroleum, has been appointed assistant director of the Mellon Institute of Industrial Research in the University of Pittsburgh.

TO CELEBRATE the victory of Sir John Brunner at the general election, the leaders of the Southport Liberal Party have arranged, instead of a complimentary banquet, a series of social gatherings to be held in different parts of the borough.

THE ENGAGEMENT is announced of Professor Dr. I. M. Heilbron, Professor of Organic Chemistry at the Liverpool University, and Miss Elda M. Davis, daughter of Mr. Herbert J. Davis and Mrs. Davis, of Sandford Lodge, Dudlow Lane, Calderstones.

AT THE annual general meeting of the Yorkshire branch of the Institute of Mechanical Engineers on Friday, January 4, Professor G. F. Charnock, of Bradford, was elected chairman for the coming year, and Mr. S. Moorhouse, Major Watson, and Mr. G. L. Murray were elected to the Committee, Mr. Murray acting as hon. secretary.

NEW DEVELOPMENT SCHEMES in hand or in prospect show that the industrialisation of Canada is proceeding rapidly. A site at St. Boniface (Manitoba) has been purchased by the Dominion Tar and Chemical Co. for the establishment of a new creosoting plant, whilst the Dye and Chemical Company of Canada are negotiating for the establishment of big plant at Kingston (Ontario).

MR. G. N. HILL, formerly chemist to the Imperial Varnish and Colour Co., Toronto, Canada, has accepted an appointment as assistant manager with Llewelyn Ryland, Ltd., varnish manufacturers, Birmingham. Mr. Hill, while at Toronto, was an active member of the Canadian Institute of Chemistry and Treasurer of the Toronto Branch of the Society of Chemical Industry.

AN EXAMPLE of the explosiveness of dust of an ordinarily non-inflammable substance occurred in a big explosion of starch dust in the Pekin (Illinois) plant of the Corn Products Refining Company on Thursday, January 3, which caused the death of 25 to 35 persons, and serious injuries to more than 100, of whom 20 are expected to die. A fire which followed the explosion made it impossible to reach many of the bodies seen in the ruins.

MR. ROBERT WILLIAMS, speaking at the Royal Colonial Institute on Tuesday, on the mineral wealth of Africa, said that rare metals, notably platinum, palladium, and uranium, existed in workable quantities, the supply of the last mineral being so copious that a plant had been erected in Belgium at which radium was extracted from it. In one mine the ore proved on analysis to contain a high percentage of uranium in combination with nickel and cobalt.

A FIRE BROKE OUT at the factory of Wright, Layman and Umney, Ltd., Southwark, makers of Wright's Coal Tar Soap, on Thursday, January 3. The fire, which occurred on the first floor, in a room where machinery for drug grinding was installed, was prevented from spreading by an automatic sprinkler which came into operation. Although dense smoke set up by burning chemicals made the work of the firemen difficult the fire was out within about half an hour.

AT A MEETING of the Birmingham Section of the Institute of Metals, on Tuesday, Mr. O. Smalley, of Newcastle, described the physical properties of 34 new alloys, showing the special value of brasses containing nickel, aluminium, manganese and tin for modern engineering practice. Of these alloys several were considered whose economic value placed them on a level with the more costly copper nickel alloys. The lecturer dealt with the effect of nickel on various brasses.

ONE OF THE principal speakers at a conference on Christian politics, economics, and citizenship at Birmingham on Tuesday, was Sir Max Muspratt, who remarked that contrary to the opinion of his friends he had tried to be a Christian all his life and an industrialist in his spare time. He referred to the difficult problems raised by the war, and the many ways in which our complex civilization was being tested, and appealed to all true citizens to work for a yet greater England and a greater civilization.

IN RECOGNITION OF HIS SERVICES as hon. secretary to the Yorkshire Section of the Chemical Employers' Federation from 1916 to 1923, Mr. Ernest Hickson was, at a private luncheon at the Midland Hotel, Bradford, on Thursday, January 3, presented with a grandfather clock. Mr. C. K. Crossland (chairman of the Yorkshire Section of the Federation) made the presentation, and paid a tribute to the excellence of the work Mr. Hickson had performed during the seven years he had held office.

THE SARNIA OIL AND GAS CO., LTD., will shortly begin the manufacture of carbon black, at plants which are being constructed at Sarnia, Ontario, and at Medicine Hat, Alta. The former plant, which consists of six burning houses, engine room, and block house, is equipped to produce 1,400 lbs. of carbon black a day. Gasoline, as well as carbon black, is to be manufactured at Medicine Hat, where a gasoline refinery, with a daily capacity of 5,000 gallons, and a carbon plant, capable of producing a thousand lbs. daily, are to be built.

THE SEVENTIETH BIRTHDAY of Dr. W. F. Hillebrand, a past president of the American Chemical Society, and one of the most honoured personalities in the Government chemical service at Washington, was celebrated at the December meeting of the Washington Section of the American Chemical Society when many tributes were paid to his work. Dr. Hillebrand, who is known among intimates as the "Supreme Court of Analytical Chemistry," announced his intention, in association with Dr. G. E. F. Landell, to write a text-book on "Analytical Inorganic Chemistry."

AT THE Sheffield Police Court, on Wednesday, Thomas Raynes & Co., Ltd., were prosecuted and fined £100 with £50 costs, under the Merchandise Marks Act, at the instance of Thomas Firth & Sons, for selling cutlery described as "Firth Stainless," which proved on analysis to be made of inferior steel of different composition. The defence was that a number of firms had supplied steel ordered as "Firths'," and that defendants therefore considered they were entitled to assume that this was all as ordered, and they had acted in good faith in marking the blades "Firth Stainless."

THE INSTITUTE OF CHEMISTRY has issued a complete report of the proceedings at the Conference held at Liverpool from October 18–20, 1923, at which it was decided among other matters that the governing body should confer with the British Association of Chemists with the object of ascertaining how they could both best serve the interests of chemists. The formation of a National Federation of Men of Science and a General Science Council was also approved. The discussions on these and other questions relating to publicity and domestic affairs are reported in full in the report.

CONTRACTS AMOUNTING TO £765,000 have been placed by the Underground Co. for 85,000 tons of cast iron tunnel segments, to be used for enlarging the tunnels on the southern section of the City and South London Line and for the new extension line between Charing Cross (Hampstead Line) and Kennington, *via* Waterloo. It is stated that the contracts have been divided between four of the leading British iron and steel structural firms. To John Cochrane and Sons (Ltd.), Westminster, has been awarded the order for 60,000 tons of the segments, the value of this contract being £540,000.

References to Current Literature

British

CARBONISATION.—Low-temperature carbonisation and the need for a national scientific policy. D. Brownlie. *J.S.C.I.*, January 4, 1924, pp. 2–4.

SOLUTION.—An attempt to correlate certain theories of solution. T. W. Jones. *J.S.C.I.*, January 4, 1924, pp. 4–6.

RUBBER.—The analysis of organic vulcanising accelerators. T. Callan and N. Strafford. *J.S.C.I.*, January 4, 1924, pp. 1–8T.

Accelerators. V. Lefebure. *Rubber Age*, January, 1924, pp. 599–609.

NITRATION.—Studies in nitration. Part I. The velocity of nitration of phenol. F. Arnall. *Chem. Soc. Trans.*, December, 1923, pp. 3111–3115.

Nitration of *p*-dichlorobenzene. H. J. Page and B. R. Heaman. *Chem. Soc. Trans.*, December, 1923, pp. 3247–3255.

SULPHONATION.—Sulphonation of *para*-substituted phenylcarbamides. J. R. Scott. *Chem. Soc. Trans.*, December, 1923, pp. 3191–3202.

PHOTO-CHEMISTRY.—The physical chemistry of the photographic process. Section II—Reactions of the plate during exposure. The mechanism of the latent image formation; exposure theories; on the sensitivity of a silver bromide emulsion; the influence of the dispersion of asphalte solutions on their light sensitiveness. *Trans. Faraday Soc.*, November, 1923, pp. 290–326.

A quantitative investigation of the photochemical interaction of chlorine and hydrogen. M. C. C. Chapman. *Chem. Soc. Trans.*, December, 1923, pp. 3062–3081.

VALENCY.—The electronic theory of valency. Part II—Organic. Applications in organic chemistry of the electronic theory; intramolecular ionisation in organic compounds; the transmission of chemical affinity by single bonds; remarks on some recent contributions to the theory of induced alternate polarities in a chain of atoms; octet stability in relation to orientation and reactivity in carbon compounds; nuclear tubes of force and bonds of variable polarity in an atom; chemical combination and activation. *Trans. Faraday. Soc.*, November, 1923, pp. 483–537.

ACIDS.—A synthesis of *m*-opianic acid. W. H. Perkin, jun., and F. W. Stoyle. *Chem. Soc. Trans.* December, 1923, pp. 3171–3176.

The partial pressures of sulphuric acid over concentrated aqueous solutions of the acid at high temperatures. J. S. Thomas and A. G. Ramsay. *Chem. Soc. Trans.*, December 1923, pp. 3256–3270.

Maconic and hydromuconic acids. Part III. Valency interchange in the hydromuconic system. E. H. Farmer. *Chem. Soc. Trans.*, December, 1923, pp. 3324–3331.

The chemistry of the glutaconic acids. Part XV. Three-carbon tautomerism in the *cyclo*-propane series. Part II. F. R. Goss, C. K. Ingold and J. F. Thorpe. *Chem. Soc. Trans.*, December, 1923, pp. 3342–3359.

United States

CYANIDES.—Nitrides as a possible route to commercial production of cyanides. F. v. Bichowsky. *Chem. Met. Eng.*, December, 17, 1923, pp. 1098–1101.

EVAPORATION.—Fundamental principles of multiple effect evaporation. Part I. H. K. Moore. *Chem. Met. Eng.*, December 17, 1923, pp. 1102–1105.

CATALYSIS. Second report of the Committee on Contact Catalysis. Adsorption and catalysis; effect of oxygen on reduction; reaction at an interface; catalytic oxidation; specific activation; special hydrogenations; stabilization; poisons; miscellaneous; general theory. W. D. Bancroft. *J. Phys. Chem.*, December, 1923, p. 801–941.

FOODSTUFFS.—The physico-chemical properties of strong and weak flours. Part VII. The physical state of the gluten as influencing the loaf volume. P. F. Sharp, R. A. Gortner and A. H. Johnson. *J. Phys. Chem.*, December, 1923, pp. 942–947.

EMULSIONS.—The theory of emulsification. P. Finkle, H. D. Draper and J. H. Hildebrand. *J. Amer. Chem. Soc.*, December, 1923, pp. 2780–2788.

REACTIONS.—Studies on reactions relating to carbohydrates and polysaccharides. Part V.—The use of acetylene for the synthesis of cyclic acetals. Part VI.—Relative ease of formation of five- and six-membered heterocyclic carbon-oxygen configurations. Part VII.—The ease of formation and nature of certain six, seven, and larger carbon-oxygen cyclic structures. H. S. Hill and H. Hibbert. *J. Amer. Chem. Soc.*, December, 1923, pp. 3108–3132.

The action of alkali on substituted uric acids. Part I. 1.3-Dimethyl-9-phenyl-uric acid. E. S. Gatewood. *J. Amer. Chem. Soc.*, December, 1923, pp. 3056–3064.

REDUCTION.—Reduction of semicarbazones. E. J. Poth and J. R. Bailey. *J. Amer. Chem. Soc.*, December, 1923, pp. 3001–3008.

SALT.—Salt from sea water. A. W. Allen. *Chem. Met. Eng.*, December 24, 1923, pp. 1131–1135.

COBALT.—The industrial utility of cobalt. F. H. Mason. *Chem. Met. Eng.*, December 24, 1923, pp. 1135–1137.

French

ACIDS.—Modern methods for the manufacture of hydrochloric acid and sodium sulphate. Part I. J. H. Frydlender. *Rev. Prod. Chim.*, December 31, 1923, pp. 825–828.

KETONES.—Production of acetone by the action of potassium acetate on acetic anhydride. E. Luce. *Compt. rend.*, December 10, 1923, pp. 1306–1309.

AMIDINES.—Chloramidines. P. Robin. *Compt. rend.*, December 10, 1923, pp. 1304–1306.

PHOSPHATES.—Hexametaphosphates. P. Pascal. *Compt. rend.*, December 10, 1923, pp. 1298–1300.

TITANIUM COMPOUNDS.—Solubility of titanic acid in alkalies and alkali carbonates. Crystalline titanium oxychloride. V. Auger. *Compt. rend.*, December 10, 1923, pp. 1302–1304.

CEMENT.—Actual manufacture of lime and cements. J. Merceron-Vicat. *La Technique Moaerne*, January 1, 1924, pp. 11–16.

REDUCTION.—Contribution to the study of the products of reduction of some acids derived from camphor. L. Palfray. *Ann. Chim.*, November–December, 1923, pp. 297–385.

DOUBLE SALTS.—Study of the equilibrium between lead chloride and iodide and some alkali chlorides and iodides in aqueous solution. *Ann. Chim.*, November–December, 1923, pp. 233–296.

WAXES.—The alcohols and hydrocarbons of beeswax. M. Gascard and G. Damoy. *Compt. rend.*, December 26, 1923, pp. 1442–1443.

HYDRATES.—Experimental determination of the composition of chlorine hydrate. A Bouzat and L. Azinières. *Compt. rend.*, December 26, 1923, pp. 1444–1446.

German

LIGNIN.—Lignin and its relation to coal. A. Pictet and M. Gaulis. *Brennstoff-Chem.*, December 15, 1923, pp. 372–377.

ANALYSIS.—The precipitation of aluminium with ammonia as the oxyhydrate. G. Jander and B. Weber. *Z. anorg. u. allg. Chem.*, November, 1923, pp. 266–274.

Gravimetric and titrimetric estimation of potassium. W. Strecker and A. Jungck. *Z. anal. Chem.*, No. 5, 1923, pp. 161–180.

Studies of the estimation of antimony by oxidation methods. J. Knop. *Z. anal. Chem.*, No. 3, 1923, pp. 81–102.

The estimation of nitrogen in coal. R. Hünerbein. *Brennstoff-Chem.*, November 15, 1923, pp. 337–338.

A method for the titrimetric estimation of potassium as bitartrate. Dr. Klapproth. *Kali*; Part I., December 1, 1923, pp. 343–345; Part II, December 15, 1923, pp. 367–369.

Patent Literature

Abstracts of Complete Specifications

207,623. DISTILLATION OR HEAT TREATMENT OF CARBONACEOUS AND LIKE MATERIAL.—H. Nielsen, 13, Firs Avenue, Muswell Hill, London, and B. Laing, Abdale House, Hatfield, Herts. Application date, September 1, 1922.

In the operation of a water-gas producer, the sensible heat of the water-gas is employed to distil the material in the retort, but it is desirable to raise the temperature of the water-gas above the normal temperature at which the gas leaves the producer—*i.e.*, 450°–550° C. In this invention, the gas produced during the blow period, or a part of it, is burned in the heaters or regenerators, and the water-gas is passed through the heaters before it enters the retort. The temperature of the water-gas may thus be raised to about 1,000° C., and two or more producers may be employed to ensure continuous working. The steam, or part of it, employed in the water-gas producers may be produced or superheated by passing through a separate receptacle containing the hot coke discharged from the retort. The water-gas is carburetted in passing through the retort, thus increasing its calorific value, and the enriched gas may be passed again through the regenerators and mixed with the water-gas. Any hydrocarbon vapour is thus converted into permanent gases. By this invention, 30,000–40,000 cubic feet of gas of 370–400 B.Th.U. per cubic foot can be obtained per ton of coal, together with 18–20 gallons of fuel oil and some low calorific power gas, compared with 12,000–20,000 cubic feet of gas of 450 B.Th.U. and 8–10 gallons of tar and some coke obtained by the usual process.

207,651. GASIFYING BITUMINOUS FUEL, PROCESS AND APPARATUS FOR. A. Breisig, 46, Erdburstgasse, Vienna. Application date, September 19, 1922.

In the continuous distillation of bituminous fuel and subsequent production of water-gas it has usually been necessary to use fuel which does not contain much moisture, since the heat required to evaporate the water and superheat the steam generated is large in comparison with the heat necessary for the remainder of the process. In the present process, fuel may be distilled and water-gas generated independently of the degree of humidity of the fuel. This is effected by storing up the sensible heat and the combustion heat of the hot blast gases during the blast period in a heat accumulator; during the run the mixture of water-gas, distillation gas, and steam, is passed through the accumulator to absorb heat, and then carried back to the producer so that it enters the fuel at the junction between the coke layer and the fuel in the distillation chamber. Heat is thus transmitted to the fuel to be distilled. In carrying out the process air is blown through the generator, and the producer gas obtained rises around the outside of the retort, which is contained within the generator and opens at the bottom into it. The producer gas is then burned in an external combustion chamber, and then passed through the heat accumulator. During the run period, steam is passed through the accumulator to the lower part of the producer, and the mixture of steam with the water-gas generated passes upwards through the retort to distil the fuel, and then to a tar separator. The whole or part of this gas then passes through the heat accumulator to be heated, and then back to the generator so that it enters the retort at the bottom at its junction with the hot coke below. A modification of this plant is also described in which two heat accumulators are used, one for the gas and the other for steam. In another modification the accumulator for heating the gas may be placed within the producer. Considerable quantities of low temperature tar are produced by this process, and are utilised for the carburation of the produced gas by circulating the vapour through the accumulator with the mixture of water-gas, distillation gas and steam.

207,660. OILS, PURIFICATION OF. R. D. Masson, 541, High Road, Gunnersbury, Middlesex, and H. Engel, 51-54, Oxford Circus House, Oxford Street, London. Application date, October 7, 1922.

The oil is supplied from a storage tank at a greater height than the rest of the plant to a heat exchanger. The supply pipe first descends and then rises to the heat exchanger, the height of the U-tube thus formed being greater than the length of a barometric column of the hot oil. The oil then passes through two heaters in succession and then to the top of the still, which is maintained under high vacuum by means of an air ejector. The column of oil assists in maintaining the vacuum. The oil passes downwards through the still, and is subjected to the action of superheated steam passing upwards, and is thus deodorised. The hot oil then passes through the heat exchanger and then to a cooler. A suitable still is also described, of the type having a number of superposed compartments communicating with one another by means of overflow openings through which the oil passes downwards and the steam upwards.

207,678. SOLUBLE SULPHONATED OILS OF ANIMAL ORIGIN, MANUFACTURE AND PRODUCTION OF. M. I. Aische, Kee Green, Buglawton, Cheshire. Application date, October 25, 1922.

Fish oil such as whale oil, sperm oil, or the like, which may or may not contain free fatty acids, is treated with sulphuric acid of 90–95 per cent. strength, or other sulphonating agent, and agitated until the oil is sulphonated. The product is diluted with cold water, the temperature being kept low, and is then washed with a saturated salt solution, and the sulphonic acid neutralised with alkali. The soluble oil is separated out and diluted as required. Reference is directed in pursuance of Section 7, Sub-section 4 of the Patents and Designs Acts, 1907 and 1919, to Specification No. 24,569/1901.

207,696. WATERS CONTAINING ALKALINE BI-CARBONATES, TREATMENT OF. E. D. Grant and Becco Engineering and Chemical Co., Ltd., 158-160, City Road, London, E.C. Application date, November 22, 1922.

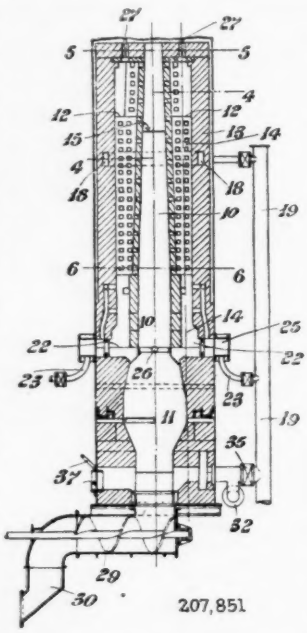
The process is for the treatment of natural waters containing alkaline bi-carbonates, to render them suitable for industrial and domestic purposes. The use of calcium chloride and calcium hydrate for this purpose is objectionable owing to the hygroscopic nature of the chloride, which renders it difficult to determine the quantity to be added. If calcium hydrate and aluminium sulphate are used, a bulky gelatinous precipitate of aluminium hydroxide is obtained, which is difficult to deal with. In the present invention, calcium sulphate and calcium hydrate are added to convert the alkali bicarbonate into alkali sulphate with precipitation of lime. The calcium hydrate added may be sufficient to precipitate the desired amount of calcium from the bicarbonate derived from the interaction of the alkali bi-carbonate with the calcium sulphate, or sufficient hydrate may be used to account for part or all of the natural calcium bi-carbonate as well as that artificially produced. The calcium sulphate added may be less than the equivalent of alkali bi-carbonate, so that the treated water contains some alkalinity, or an excess of calcium sulphate may be added to obtain a water of any desired degree of permanent hardness. The calcium sulphate and calcium hydrate may be added in aqueous solution of suspension, but are preferably added in finely divided solid form. Some examples of the treatment of alkaline waters are given, together with the results obtained.

207,840. DYESTUFF INTERMEDIATES, MANUFACTURE OF. J. Thomas and Scottish Dyes, Ltd., Murrell Hill Works, Carlisle. Application date, July 8, 1922.

The process is more particularly for the manufacture of anthraquinone-1-chlor-2-carboxylic acid, and in this invention the number of stages of manufacture are reduced. The starting substance is usually 2-methylanthraquinone, and it has been found that this substance can be chlorinated in sulphuric acid or weak oleum, and the resulting chlormethylanthraquinone can be oxidised in sulphuric acid solution. 2-methylanthraquinone may be prepared by the condensation of toluene with phthalic anhydride to form paratoluoylbenzoic acid, and condensing the latter to 2-methylanthraquinone in sulphuric acid or weak oleum. The resulting solution may be directly chlorinated and then oxidised by means of manganese peroxide to obtain the anthraquinone-1-chlor-2-carboxylic acid. The latter is thus obtained without the isolation of any of the intermediate substances. Detailed examples of this process are given.

207,851. COMBUSTIBLE GASES, MANUFACTURE OF. C. F. Broadhead, "Nestlebrae," Junction Road, Clayfield, near Brisbane; F. G. Barker, 37, Canterbury Road, Canterbury, Melbourne; and P. C. H. Hunt, "Avon," St. Kilda Road, Melbourne. Application date, September 1, 1922.

The apparatus is for the manufacture of combustible gases from bituminous coal, non-caking coal, or lignite in a plant in which the fuel is first distilled in a vertical retort, superposed over a generator, by means of producer gas or water-gas from the generator. The carbonised material then passes downwards into the generator to be gasified. In this process, difficulties are experienced in thoroughly carbonising the fuel in the retort if caking or bituminous coal is used, owing to the passage of the gases through channels in the material instead of percolating through it. Further, the gases from the top of the retort may contain hydrocarbons which are not required, and the water-gas generated on the down runs passes out without enrichment. The object is to avoid these disadvantages. A tapering vertical retort 10 is stayed to the main outside casing by studded vertical walls 12, which form vertical flues 14 surrounding the retort. The top of the retort is divided by a longitudinal wall 15 into two compartments, one of which increases in sectional area downwards, so that the downward travel of the fuel is facilitated. The lower edge of the plate 15 provides a sudden enlargement of cross section which gives a rolling action to the fuel and prevents caking. The gas is withdrawn through the other compartment, and is superheated in it. Secondary air is supplied through a main 19 and ports 18 for the combustion of the producer gas in the upper part of the flues. Gas from the generator 11 passes into the flues 14 through ports 22, and air blasts are supplied through pipes 23 from the main 19 to maintain combustion. Tar or oil is supplied through a sprayer 26 to the coke in the generator 11, and also through sprayers 27 at the top of the flues 14 during the periods of gas-making, either for up runs or for down runs. The tar is cracked in its downward passage, and then passes either upwards through the retort during up runs, or downwards through the generator during down runs. The residue is discharged from the generator 11 by a conveyor 29. The distillation of the fuel is effected partly by the heat of the water-gas passing upwards through it, and partly by the heat of combustion from the flues. The gases may be led from the top of the retort and from the bottom of the generator to a common carburetting chamber into which tars or oils are sprayed. The method of operation of the plant is described in detail.



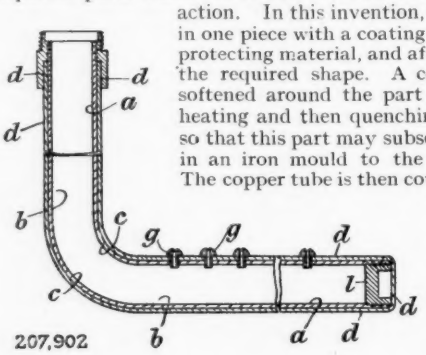
207,851

207,919. PAINTS, AND METHODS OF MANUFACTURING THE SAME. Plauson's (Parent Co.), Ltd., 17, Waterloo Place, Pall Mall, London, S.W.1. From H. Plauson, 26, Jarrestrasse, Hamburg, Germany. Application date, September 25, 1922.

Pigments are treated in a colloid mill such as described in Specification No. 155,836 (see THE CHEMICAL AGE, Vol. IV., p. 313) with drying or semi-drying oils which have been only partly oxidised. Driers such as oleates, resinates and naphthenates are added, and these have also the effect of dispersators. It is found that if the disintegration is carried out in other oils such as linseed or rape oil, the disintegration is very slow, and a partly oxidised oil is therefore used. As an example, linseed oil heated to 150° C. for two hours is suitable for this purpose; this oil is considerably less oxidised than ordinary boiled linseed oil. In an example, red lead is treated in the above manner and yields a homogeneous paint of a bright orange colour, which is distinct from the usual red lead paint and dries readily.

207,902. PIPES FOR USE WHEN IMMERSED IN CHEMICAL LIQUIDS. F. Judson, 4, Hall View, Oak Road, New Wortley, Leeds, and J. M. Gibson and H. Galloway, Britannia Works, Britannia Street, Wellington Street, Leeds. Application date, September 15, 1922.

Pipes for steam heating or like purposes, which have to be immersed in a liquid, usually have their horizontal and vertical portions and connecting junction pieces or elbows made in separate parts which are coated with lead to resist chemical action. In this invention, the pipe is made in one piece with a coating of lead or other protecting material, and afterwards bent to the required shape. A copper tube *a* is softened around the part *b*, *b*, such as by heating and then quenching in cold water, so that this part may subsequently be bent in an iron mould to the required angle. The copper tube is then covered with a lead sheet *d*, and then bent to the required shape without injury to the lead sheath. The horizontal portion is then drilled and provided with a number of nozzles *g* of a suitable alloy, which are screwed into the sheath. The end of the pipe is provided with a screwed plug *l* of the same alloy as the nozzles, and all these parts are sweated in position. The lead sheathing *d* is then drawn over the end of the pipe and sealed by welding to protect the pipe. The application of this pipe for use in heating dye vats is described.



207,902

207,995. GAS PURIFICATION, METHOD OF AND APPARATUS FOR USE IN. W. B. Davidson, 12, Akenside Hill, Newcastle-on-Tyne. Application date, November 25, 1922.

In the purification of gas by means of catalytic substances, the catalyst is supported in the form of a thin film or coating on thin material having a surface as large as possible compared with its thickness. The material is arranged so as to ensure a free passage of the gas without producing back pressure, as when granular or powdered material is used. The catalytic material may be an oxide such as iron oxide, or a metal such as platinum, and may form a film or coating on spirals or scrolls of thin narrow strips of material, or thin wire wound spirally. The support may consist of thin strips of sheet iron coated with a film of rust to form a catalyst, by submitting them to the action of steam and air. The material is applicable for the removal of sulphuretted hydrogen from coal gas. The gas is preheated before passing over the material and the issuing gas is treated to recover the sulphur.

NOTE.—Abstracts of the following specifications, which are now accepted, appeared in the CHEMICAL AGE when they became open to inspection under the International Convention: 192,032 (Guggenheim Bros.) relating to the manufacture of sodium nitrate, see Vol. VIII. p. 317; 195,033 (P.M. Travis and C. A. Glabau), relating to the preparation of emulsions, see Vol. VIII. p. 576; 195,598 (L'Air Liquide, Soc. Anon. pour l'Etude et l'Exploitation des Procédés G. Claude) relating to the treatment of coal or coke-oven gases prior to liquefaction for the recovery of hydrogen, see Vol. VIII. p. 600; 200,087 (Elektrizitätswerk Lonza) relating to the production of solid polymerisation products of acetylene, see Vol. IX. p. 265. 186,900 (Farbwerke vorm. Meister, Lucius and Brüning), relating to manufacture of methane, see Vol. VII., p. 830; 188,634 (Guggenheim Bros.), relating to leaching and recovery of nitrate from caliche, see Vol. VIII., p. 69; 195,089 (Aktieselskabet, Hydropeat), relating to manufacture of colloidal solutions of ferric oxide, see Vol. VIII., p. 577; 196,579 (L. Schmidt), relating to manufacture of glycerine and alkali soaps, see Vol. VIII., p. 677; 198,645 (O. Nyedegger), relating to manufacture of sulphate of chromium, see Vol. IX., p. 156; 200,788 (Naugatuck Chemical Co.), relating to a process for the vulcanisation of rubber, see Vol. IX., p. 319; 201,510 (Soc. de Stearinerie et Savonnerie de Lyon), relating to manufacture of cellulose esters, see Vol. IX., p. 349.

International Specifications not yet Accepted

206,142. NAPHTHOQUINONE DERIVATIVES. Soc. Anon. des Matières Colorantes et Produits Chimiques de St. Denis, 105, Rue La Fayette, Paris, A. Wahl, 14*bis*, Boulevard Cotte, Enghien, Seine-et-Oise, France, and R. Lantz, 226, Rue La Fayette, Paris. International Convention date, October 30, 1922.

1-arylimino-2-naphthoquinones are treated with a primary aromatic amine to produce 4-arylamino-1-arylimino-2-naphthoquinones (1.4. diarylimino-2-naphthols). If the amine is in excess, the products contain two similar aryl radicles, the initial product reacting with a further molecule of the primary amine. Oxyaryl-naphthylamine is a by-product, and may be treated with an oxidising agent, or with air and a catalyst, in presence of a primary amine, to obtain more 4-arylamino-1-arylimino-2-naphthoquinone. These products may be boiled with glacial acetic acid to convert them into the isomeric -arylimino-2-arylamino-1-naphthoquinones. In an example, 1-phenylimino-2-naphthoquinone is treated with an acetone solution of aniline or *p*-toluidine, yielding 4-phenylamino-1-phenylimino-2-naphthoquinone or 4-*p*-tolylamino-1-*p*-tolylimino-2-naphthoquinone. Other examples of similar reactions are given, and also of the isomerization. If the 4-arylamino-1-arylimino-2-naphthoquinones are hydrolysed by aqueous acids, 4-arylimino-2-oxy-1-naphthoquinones (4-arylamino-1.2-naphthoquinones) are obtained.

206,488. DYES. Soc. Anon. des Matières Colorantes et Produits Chimiques de St. Denis, 105, Rue La Fayette, Paris; A. Wahl, 14 *bis*, Boulevard Cotte, Enghien, Seine-et-Oise, France, and R. Lantz, 226, Rue La Fayette, Paris. International Convention date, October 31, 1922.

Specification 206,142 (see above) describes the preparation of 4-arylamino-1-arylimino-2-naphthoquinones, and these are now condensed with primary amines to form dyestuffs of the azine group. Air or an oxidising agent is introduced to avoid liberation of hydrogen. In an example, 4-phenylamino-1-phenylimino-2-naphthoquinone is heated with aniline and a catalyst such as benzoic acid, acetic acid or zinc chloride, to 160° C. Aniline is eliminated and the phenyl-rosinduline produced is extracted with acidified alcohol, and the base precipitated by alkali. In another example the same product is obtained directly from 1-arylamino-2-naphthol by oxidation and condensation.

LATEST NOTIFICATIONS.

208,684. Processes and methods of obtaining calcium oxalate from vegetable matter. Bhopal Produce Trust, Ltd. December 21, 1922.

208,685. Process of manufacturing carbohydrate esters. Soc. de Stéarinerie et Savonnerie de Lyon. December 21, 1922.

208,689. Manufacture of acetaldehyde. Canadian Electro Products Co., Ltd. December 21, 1922.

208,691. Process for the distillation of tars. Rütgerswerke Akt.-Ges., and Kahl, L. December 20, 1922.

208,699. Production of albumen dyestuff products or compounds. Haco-Ges. Akt.-Ges. Bern. December 20, 1922.

208,720. Manufacture of dyestuffs from naphthidine. Compagnie Nationale de Matières Colorantes et de Produits Chimiques. December 21, 1922.

208,721. Process for manufacture of perylene. Compagnie Nationale de Matières Colorantes et de Produits Chimiques. December 21, 1922.

208,722. Process for the manufacture of perylene. Compagnie Nationale de Matières Colorantes et de Produits Chimiques. December 21, 1922.

209,073. Process of bleaching fibrous material of vegetable origin, cellulose, paper, and the like. Hamburger, R., and Kaesz, S. December 23, 1922.

209,092. Manufacture of vat dye-stuffs. Farbwerke vorm. Meister, Lucius, and Brüning. December 27, 1922.

209,094. Basic dyes. Du Pont de Nemours and Co., E.I. December 26, 1922.

209,100. Treatment of complex ores containing zinc. Clerc, C., and Nihoul, A. December 28, 1922.

Specifications Accepted, with Date of Application

201,912. Rubber, Process for the vulcanisation of. Pirelli & Co. August 5, 1922.

202,613. Colloidal sulphur, Process for the manufacture of. H. Vogel. August 16, 1922.

204,335. Oil from shale or the like, Apparatus for extracting. S. E. Co. September 20, 1922.

208,569. Hydrocarbon liquids, Processes for transforming—into liquids of lower boiling point. S. J. M. Auld. July 20, 1922.

208,578. Alkali carbonates, Process for the manufacture of. Plauson's (Parent Co.), Ltd. (*H. Plauson.*) September 13, 1922.

208,579. Agglomerating mixtures of fine ore and fuel in shaft furnaces, Process of. C. Giesecke. September 14, 1922.

208,586. Hydrocarbon oil material, Process and apparatus for extracting—from oil bearing earthy material. D. T. Day. September 18, 1922.

208,623. Drying ores, slags, limestone, clinker, sand, chemical substances and similar materials, Apparatus for. Sir W. G. Armstrong, Whitworth and Co., Ltd., J. M. Jackson and H. O. Jones. November 9, 1922.

208,632. Effecting intimate contact of gases and liquids, Apparatus for. E. Lloyd, Simon-Carves, Ltd., and Meldrums, Ltd. December 8, 1922.

208,649. Electrolysing fused salts of metals and recovering the metals and acid radicles, Process and apparatus for, and the application to the recovery of valuable constituents from metal-bearing ores and materials. E. A. Ashcroft. January 11, 1923. Addition to 198,024.

208,656. Catalytic agents, Manufacture of. W. A. Patrick. January 17, 1923.

Applications for Patents

Boake, Roberts, and Co., Ltd., A., and Bloomfield, A. L. Packing for fractionating columns, etc. 175. January 3.

Calderwood, W., Reihl, C. A., and Webb, A. E. Preparation of oils for varnishes, printing inks, paints, etc. 32,623. December 31.

Clerc, C., and Nihoul, A. Treatment of zinc ores. 32,416. December 28. (France, December 28, 1922.)

Clerc, C., and Nihoul, A. Treatment of zinc ores. 32,629. December 31. (France, February 24.)

Coley, H. E., and Hornsey, J. W. Production of iron from ores. 83. January 2.

Coley, H. E. Apparatus for manufacture of zinc, etc. 84. January 2.

Coley, H. E. Furnaces for reduction of ores or oxides. 85. January 2.

Coley, H. E. Manufacture of thorium, cerium, etc. 86. January 2.

Coley, H. E. Extraction of gold from arsenical ores. 87. January 2.

Coley, H. E. Manufacture of barium sulphide and barium hydroxide 88. January 2.

Coley, H. E., and Hornsey, J. W. Rotary furnaces, etc. 179. January 3.

Coley, H. E. Method of sealing rotary kilns, etc. 180. January 3.

Coley, H. E., and Hornsey, J. W. Production of magnetic oxide of iron. 183. January 3.

Coley, H. E., and Hornsey, J. W. Manufacture of iron from iron ores. 184, 185, 186. January 3.

Coley, H. E., and Hornsey, J. W. Manufacture of steel. 187. January 3.

Coley, H. E., and Hornsey, J. W. Manufacture of alloys. 188. January 3.

Farbwerke vorm. Meister, Lucius, and Brüning. Manufacture of vat dyestuffs. 32,331. December 27. (Germany, December 27, 1922.)

Farbenfabriken vorm. F. Bayer and Co. Manufacture of sulphurised compounds of phenols. 115. January 2. (Germany, February 9, 1923.)

Fourneau, E., and Soc. Anon. des Etablissements Poulenc Frères. Manufacture of a symmetrical urea. 60. January 1. (France, November 14, 1923.)

Grasselli, C. A. Processes of making hydrochloric acid and salt cake. 32,359. December 27.

Imray, O. Y., and Soc. of Chemical Industry in Basle. Manufacture of physiologically-active substances. 32,523. December 29.

Imray, O. Y., and Soc. of Chemical Industry in Basle. Manufacture of vat dyestuffs. 32,524. December 29.

Imray, O. Y., and Soc. of Chemical Industry in Basle. Manufacture of the phosphorus-containing nuclear substance of milk casein. 32,627. December 31.

Imray, O. Y., and Soc. of Chemical Industry in Basle. Manufacture of a vat dyestuff. 32,628. December 31.

Industrial Resinera-Ruth Soc. Anon. Production of a mixture of camphene and isobornyl esters. 217. January 3. (Spain, January 5, 1923.)

Mendel Akt.-Ges., A., and Wolffenstein, R. Process for producing halogen-albumin compounds. 5. January 1. (Germany, March 29, 1923.)

Plauson's (Parent Co.), Ltd., and Plauson. Manufacture of sulphur dyestuffs. 32,464. December 29.

Soc. of Chemical Industry in Basle. Manufacture of intermediate products and dyestuffs therefrom. 295. January 4. (Switzerland, January 24, 1923.)

Stephen H. Manufacture of aldehydes and intermediate products. 10. January 1.

Market Report and Current Prices

Our Market Report and Current Prices are exclusive to THE CHEMICAL AGE, *and, being independently prepared with absolute impartiality by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., may be accepted as authoritative. The prices given apply to fair quantities delivered ex wharf or works, except where otherwise stated. The current prices are given mainly as a guide to works managers, chemists, and chemical engineers; those interested in close variations in prices should study the market report.*

London, January 10, 1924.

BUSINESS is gradually recovering although in many directions stockstaking is still in progress. Such changes as have occurred are mostly in an upward direction, and generally speaking the tendency is healthy. Prices of many articles seem to have touched bottom and with a revival of interest some interesting developments may be seen.

Export markets are without special feature.

General Chemicals

ACETONE is in good demand at recent figures.

ACID ACETIC.—A good turnover is reported, price is higher.

ACID CITRIC remains uninteresting.

ACID FORMIC is very scarce—spot supplies are eagerly competed for.

ACID LACTIC is unchanged.

ACID OXALIC has been in better demand, and is rather firmer.

ACID TARTARIC.—A general advance in price is looked for.

FORMALDEHYDE is unchanged.

LEAD ACETATE is in fair demand and without alteration in value.

LEAD NITRATE is unchanged.

LIME ACETATE is unchanged.

LITHOPONE is quiet—price is firmer.

POTASSIUM CAUSTIC AND CARBONATE are unchanged.

POTASSIUM PERMANGANATE is in good demand, spot supplies are light. Price is likely to go higher.

POTASSIUM PRUSSIATE is very slow of sale with several weak holders.

SODIUM ACETATE.—There is a considerable inquiry abroad, but the home trade demand is almost non-existent.

SODIUM HYPOSULPHITE is actively inquired for, and a considerable volume of business is being transacted.

SODIUM NITRITE is scarce. There are only a few parcels available. Price is steadily advancing.

SODIUM PRUSSIATE.—There are indications that a change in an upward direction may occur shortly; manufacturers find the present prices very unremunerative.

Pharmaceutical Chemicals

ACETYL SALICYLIC ACID.—A continued steady demand is reported, price unchanged.

ACETANILID.—Limited supplies which have arrived found ready buyers.

ACID SALICYLIC.—In spite of the weak carbolic market, price is well maintained, makers' output being sold ahead.

BETANAPHTHOL RESUBLIMED.—The market is almost bare of supplies at the present time. Price is nominal.

BROMIDES are in better demand, last prices being slightly shaded in some directions, but the general position appears to be sound as stocks cannot be replaced at current Continental makers' prices.

EUCALYPTUS OIL is in buyers' favour.

HEXAMINE continues firm, prices asked by leading Continental makers being far in advance of the London parity.

LITHIA CARBONATE has advanced with the movement in the exchange.

METHYL SALICYLATE is in good demand at current rates.

MILK SUGAR.—Cheaper parcels are regularly passing into consumption, and higher prices are expected to rule.

PHENACETIN is slightly easier on a slow market.

SODA SALICYLATE.—Leading manufacturers are sold well ahead, the demand exceeding the supply.

SALOL remains firm, higher prices being asked by some holders.

VANILLIN is firmer.

Coal Tar Intermediates

Business during the past week has continued to progress on quiet, steady lines with nothing of signal interest to report.

ALPHA NAPHTHOL continues firm, with no large stocks available.

ALPHA-NAPHTHYLAMINE is unchanged.

ANILINE OIL is steady, with a slightly better demand.

ANILINE SALT.—Some home inquiries are reported.

BENZIDINE BASE is featureless.

BETA NAPHTHOL.—Some fair home orders are offered.

DIMETHYANILINE remains in fair demand at recent values.

DIPHENYLAMINE is quite firm, with no large stocks in evidence.

NITROBENZOL continues to pass regularly into consumption.

PARANITRANILINE.—A fair inquiry is reported.

R. SALT is without special change to report.

XYLIDINE has been a small home trade at recent values.

Coal Tar Products

The market generally in Coal Tar Products is quiet, with no great volume of fresh inquiry.

BENZOL, 90%.—Is in poor deamnd, and is worth about 1s. 1d. to 1s. 1½d. per gallon on rails.

PURE BENZOL has also a meagre inquiry, and is quoted at 1s. 4½d. to 1s. 5½d. per gallon.

CREOSOTE OIL remains firm, being worth 8¾d. to 9d. per gallon on rails in the North, while the price in the South is 9¾d. to 10d. per gallon.

CRESYLIC ACID is quietly steady at 1s. 10d. to 2s. per gallon on rails for the Pale quality 97/99%, while the Dark quality 95/97% is quoted at 1s. 6d. to 1s. 8d. per gallon on rails.

SOLVENT NAPHTHA is also plentiful, and is quoted at 11d. to 1s. per gallon on rails.

HEAVY NAPHTHA is quoted at 1s. per gallon on rails.

NAPHTHALENES remain unchanged at £7 to £7 10s. per ton for the low grade quality, £8 to £8 10s. per ton for 74/76, and £8 15s. to £9 per ton for 76/78.

PITCH remains quiet. The demand from abroad is disappointing. Prices are practically unchanged.

Sulphate of Ammonia

There are no new features to report.

A Chemical Prize Essay Competition

A NOTABLE scheme has been started by the American Chemical Society to increase the public appreciation of the value of the work of the chemist. This takes the form of a prize essay competition for young people on a large scale. Ten thousand dollars have been given by Mr. Francis P. Garvan, for use in the competition, and six prizes of $20 are to be awarded in each State to the students in secondary schools for the six best essays. A committee consisting of Mr. H. E. Howe (editor of *Industrial and Engineering Chemistry*), and Messrs. W. D. Bancroft, C. H. Herty and Alexander Williams, jr., have been appointed to carry on the work of organising the competition on behalf of the A.C.S. A certain choice of subjects is allowed. Competitors may write on the relation of chemistry to either health and disease; the enrichment of life; agriculture and forestry; national defence; the home; or the development of the industries and resources of their State. To assist competitors a number of books have been distributed free to the libraries in all high schools. In addition, there is to be a selection of the best essayists in the State competition for four-year scholarships at Yale University or Vassar College. In the booklet describing the competition there is a most suggestive article in the mediæval style on the services chemists could render to the dwellers in a beleaguered land. The American Chemical Society is to be congratulated in carrying out this public work.

Current Market Prices

General Chemicals

	Per	£	s.	d.		£	s.	d.
Acetic anhydride, 90–95%	lb.	0	1	4	to	0	1	5
Acetone oil	ton	80	0	0	to	85	0	0
Acetone, pure	ton	125	0	0	to	126	0	0
Acid, Acetic, glacial, 99–100%	ton	73	0	0	to	74	0	0
Acetic, 80% pure	ton	51	0	0	to	52	0	0
Acetic, 40% pure	ton	26	0	0	to	27	0	0
Arsenic, liquid, 2000 s.g.	ton	85	0	0	to	88	0	0
Boric, commercial	ton	48	0	0	to	52	0	0
Carbolic, cryst. 39–40%	lb.	0	0	11½	to	0	1	0
Citric	lb.	0	1	5	to	0	1	5½
Formic, 85%	ton	64	0	0	to	65	0	0
Hydrofluoric	lb.	0	0	7½	to	0	0	8½
Lactic, 50 vol.	ton	39	0	0	to	40	0	0
Lactic, 60 vol.	ton	45	0	0	to	47	0	0
Nitric, 80 Tw.	ton	24	0	0	to	25	0	0
Oxalic	lb.	0	0	5¾	to	0	0	6
Phosphoric, 1.5	ton	35	0	0	to	38	0	0
Pyrogallic, cryst.	lb.	0	5	9	to	0	6	0
Salicylic, technical	lb.	0	1	9½	to	0	2	0
Sulphuric, 92–93%	ton	6	0	0	to	7	0	0
Tannic, commercial	lb.	0	2	3	to	0	2	9
Tartaric	lb.	0	1	0½	to	0	1	1
Alum, lump	ton	12	10	0	to	13	0	0
Chrome	ton	23	0	0	to	24	0	0
Alumino ferric	ton	7	0	0	to	7	5	0
Aluminium, sulphate, 14–15%	ton	8	10	0	to	9	0	0
Sulphate, 17–18%	ton	10	10	0	to	11	0	0
Ammonia, anhydrous	lb.	0	1	6	to	0	1	8
.880	ton	32	0	0	to	34	0	0
.920	ton	22	0	0	to	24	0	0
Carbonate	ton	30	0	0	to	32	0	0
Chloride	ton	50	0	0	to	55	0	0
Muriate (galvanisers)	ton	32	0	0	to	33	0	0
Nitrate (pure)	ton	40	0	0	to	45	0	0
Phosphate	ton	63	0	0	to	65	0	0
Sulphocyanide, commercial 90%	lb.	0	1	1	to	0	1	3
Amyl acetate, technical	ton	280	0	0	to	300	0	0
Arsenic, white powdered	ton	65	0	0	to	68	0	0
Barium, carbonate, Witherite	ton	5	0	0	to	6	0	0
Carbonate, Precip.	ton	15	0	0	to	16	0	0
Chlorate	ton	65	0	0	to	70	0	0
Chloride	ton	14	10	0	to	15	0	0
Nitrate	ton	33	0	0	to	35	0	0
Sulphate, blanc fixe, dry	ton	20	10	0	to	21	0	0
Sulphate, blanc fixe, pulp	ton	10	5	0	to	10	10	0
Sulphocyanide, 95%	lb.	0	0	11	to	0	1	0
Bleaching powder, 35–37%	ton	10	0	0	to	10	10	0
Borax crystals, commercial	ton	25	0	0	to		—	
Calcium acetate, Brown	ton	13	0	0	to	14	0	0
Grey	ton	22	0	0	to	23	0	0
Carbide	ton	13	0	0	to	13	10	0
Chloride	ton	5	15	0	to	6	0	0
Carbon bisulphide	ton	35	0	0	to	40	0	0
Casein technical	ton	80	0	0	to	90	0	0
Cerium oxalate	lb.	0	3	0	to	0	3	6
Chromium acetate	lb.	0	1	1	to	0	1	3
Cobalt acetate	lb.	0	6	0	to	0	6	6
Oxide, black	lb.	0	9	6	to	0	10	0
Copper chloride	lb.	0	1	1	to	0	1	2
Sulphate	ton	25	0	0	to	25	10	0
Cream Tartar, 98–100%	ton	86	0	0	to	88	0	0
Epsom salts (*see* Magnesium sulphate)								
Formaldehyde, 40% vol.	ton	63	0	0	to	64	0	0
Formusol (Rongalite)	lb.	0	1	11	to	0	2	0
Glauber salts, commercial	ton	4	0	0	to	4	10	0
Glycerin crude	ton	65	0	0	to	67	10	0
Hydrogen peroxide, 12 vols.	gal	0	2	0	to	0	2	1
Iron perchloride	ton	18	0	0	to	20	0	0
Sulphate (Copperas)	ton	3	10	0	to	4	0	0
Lead acetate, white	ton	44	0	0	to	46	0	0
Carbonate (White Lead)	ton	50	0	0	to	52	0	0
Nitrate	ton	44	10	0	to	45	0	0
Litharge	ton	37	0	0	to	39	0	0
Lithophone, 30%	ton	22	10	0	to	23	0	0
Magnesium chloride	ton	3	10	0	to	3	15	0
Carbonate, light	cwt.	2	10	0	to	2	15	0
Sulphate (Epsom salts commercial)	ton	5	15	0	to	6	0	0
Sulphate (Druggists')	ton	8	0	0	to	9	0	0
Manganese Borate, commercial	ton	65	0	0	to	75	0	0
Sulphate	ton	45	0	0	to	50	0	0
Methyl acetone	ton	82	0	0	to	85	0	0
Alcohol, 1% acetone	ton	80	0	0	to	85	0	0
Nickel sulphate, single salt	ton	37	0	0	to	38	0	0
Ammonium sulphate, double salt	ton	37	0	0	to	38	0	0

	Per	£	s.	d.		£	s.	d.
Potash, Caustic	ton	33	0	0	to	34	0	0
Potassium bichromate	lb.	0	0	5½	to		—	
Carbonate, 90%	ton	30	0	0	to	31	0	0
Chloride, 80%	ton	9	0	0	to	10	0	0
Chlorate	lb.	0	0	3½	to		—	
Metabisulphite, 50–52%	ton	65	0	0	to	70	0	0
Nitrate, refined	ton	38	0	0	to	40	0	0
Permanganate	lb.	0	0	10½	to	0	0	10¾
Prussiate, red	lb.	0	2	8	to	0	2	10
Prussiate, yellow	lb.	0	0	10½	to	0	0	11
Sulphate, 90%	ton	10	0	0	to	10	10	0
Salammoniac, firsts	cwt.	2	15	0	to		—	
Seconds	cwt.	2	17	6	to		—	
Sodium acetate	ton	25	0	0	to	25	10	0
Arsenate, 45%	ton	45	0	0	to	48	0	0
Bicarbonate	ton	10	10	0	to	11	0	0
Bichromate	lb.	0	0	4½	to		—	
Bisulphite, 60–62%	ton	21	0	0	to	23	0	0
Chlorate	lb.	0	0	3	to	0	0	3½
Caustic, 70%	ton	17	10	0	to	18	0	0
Caustic, 76%	ton	18	10	0	to	19	0	0
Hydrosulphite, powder	lb.	0	1	5	to	0	1	6
Hyposulphite, commercial	ton	10	10	0	to	11	0	0
Nitrite, 96–98%	ton	31	0	0	to	32	0	0
Phosphate, crystal	ton	16	0	0	to	16	10	0
Perborate	lb.	0	0	11	to	0	1	0
Prussiate	lb.	0	0	6	to		—	
Sulphide, crystals	ton	8	10	0	to	9	0	0
Sulphide, solid, 60–62 %	ton	15	0	0	to	16	10	0
Sulphite, cryst.	ton	11	10	0	to	12	0	0
Strontium carbonate	ton	50	0	0	to	55	0	0
Nitrate	ton	50	0	0	to	55	0	0
Sulphate, white	ton	6	10	0	to	7	10	0
Sulphur chloride	ton	25	0	0	to	27	10	0
Flowers	ton	11	0	0	to	11	10	0
Roll	ton	9	15	0	to	10	10	0
Tartar emetic	lb.	0	0	11½	to	0	1	0
Tin perchloride, 33%	lb.	0	1	1	to	0	1	2
Perchloride, solid	lb.	0	1	3	to	0	1	4
Protochloride (tin crystals)	lb.	0	1	4	to	0	1	5
Zinc chloride 102° Tw.	ton	20	0	0	to	21	0	0
Chloride, solid, 96–98%	ton	25	0	0	to	30	0	0
Oxide, 99%	ton	42	0	0	to	45	0	0
Dust, 90%	ton	50	0	0	to	55	0	0
Sulphate	ton	15	0	0	to	16	0	0

Pharmaceutical Chemicals

Acetyl salicylic acid	lb.	0	3	9	to	0	4	0
Acetanilid	lb.	0	3	3	to	0	3	6
Acid, Gallic, pure	lb.	0	3	0	to	0	3	3
Lactic, 1.21	lb.	0	2	10	to	0	3	3
Salicylic, B.P.	lb.	0	2	6	to	0	2	8
Tannic, leviss	lb.	0	3	2	to	0	3	4
Amidol	lb.	0	7	6	to	0	8	0
Amidopyrin	lb.	0	14	0	to	0	14	6
Ammon ichthosulphonate	lb	0	1	10	to	0	2	0
Barbitone	lb.	0	17	6	to	0	18	6
Beta naphthol resublimed	lb.	0	3	0	to	0	3	6
Bromide of ammonia	lb.	0	0	10½	to	0	1	0
Potash	lb.	0	0	9	to	0	0	9½
Soda	lb.	0	0	9½	to	0	0	10½
Caffeine, pure	lb.	0	12	3	to	0	12	9
Calcium glycerophosphate	lb.	0	5	9	to	0	6	0
Lactate	lb.	0	2	3	to	0	2	6
Calomel	lb.	0	3	9	to	0	4	0
Chloral hydrate	lb.	0	4	3	to	0	4	6
Cocaine alkaloid	oz.	1	0	0	to	1	1	0
Hydrochloride	oz.	0	17	0	to	0	17	6
Corrosive sublimate	lb.	0	3	3	to	0	3	6
Eucalyptus oil, B.P. (70–75% eucalyptol)	lb.	0	2	6	to	0	2	8
B.P. (75–80% eucalyptol)	lb.	0	2	7	to	0	2	9
Guaiacol carbonate	lb.	0	13	6	to	0	14	0
Liquid	lb.	0	12	6	to	0	13	0
Pure crystals	lb.	0	13	0	to	0	13	6
Hexamine	lb.	0	4	6	to	0	4	9
Hydroquinone	lb.	0	4	3	to	0	4	6
Lanoline anhydrous	lb.	0	0	7	to	0	0	6
Lecithin ex ovo	lb.	1	5	0	to	1	7	6
Lithi carbonate	lb.	0	10	0	to	0	10	6
Methyl salicylate	lb.	0	3	0	to	0	3	6
Metol	lb.	0	9	0	to	0	10	0
Milk sugar	cwt	4	2	6	to	4	10	0
Paraldehyde	lb.	0	1	7	to	0	1	9
Phenacetin	lb.	0	7	6	to	0	8	0
Phenazone	lb.	0	8	6	to	0	9	0
Phenolphthalein	lb.	0	8	3	to	0	8	6
Potassium sulpho guaiacolate	lb.	0	7	3	to	0	7	9
Quinine sulphate, B.P.	oz.	0	2	3	to		—	

	Per	£	s.	d.		£	s.	d.
Resorcin, medicinal	lb.	0	5	9	to	0	6	0
Salicylate of soda powder	lb.	0	3	0	to	0	3	3
Crystals	lb.	0	3	0	to	0	3	3
Salol	lb.	0	4	0	to	0	4	3
Soda Benzoate	lb.	0	3	6	to	0	3	9
Sulphonal	lb.	0	17	0	to	0	18	0
Terpene hydrate	lb.	0	1	9	to	0	2	0
Theobromine, pure	lb.	0	12	0	to	0	12	3
Soda salicylate	lb	0	8	6	to	0	9	0
Vanillin	lb.	1	4	0	to	1	5	0

Coal Tar Intermediates, &c.

Alphanaphthol, crude	lb.	0	1	9	to	0	2	0
Refined	lb.	0	2	3	to	0	2	6
Alphanaphthylamine	lb.	0	1	6½	to	0	1	7
Aniline oil, drums extra	lb.	0	0	8¾	to	0	0	9
Salts	lb.	0	0	9	to	0	0	9¼
Anthracene, 40–50%	unit	0	0	8¾	to	0	0	9
Benzaldehyde (free of chlorine)	lb.	0	2	9	to	0	3	0
Benzidine, base	lb.	0	4	6	to	0	4	9
Sulphate	lb.	0	3	6	to	0	3	9
Benzoic acid	lb.	0	2	0	to	0	2	3
Benzyl chloride, technical	lb.	0	2	0	to	0	2	3
Betanaphthol	lb.	0	1	1	to	0	1	2
Betanaphthylamine, technical	lb.	0	4	0	to	0	4	3
Croceine Acid, 100% basis	lb.	0	3	3	to	0	3	6
Dichlorbenzol	lb.	0	0	9	to	0	0	10
Diethylaniline	lb.	0	4	6	to	0	4	9
Dinitrobenzol	lb.	0	1	1	to	0	1	2
Dinitrochlorbenzol	lb.	0	0	11	to	0	1	0
Dinitronaphthalene	lb.	0	1	4	to	0	1	5
Dinitrotoluol	lb.	0	1	3	to	0	1	4
Dinitrophenol	lb.	0	1	6	to	0	1	7
Dimethylaniline	lb.	0	2	9	to	0	3	0
Diphenylamine	lb.	0	3	3	to	0	3	6
H-Acid	lb.	0	4	6	to	0	4	9
Metaphenylenediamine	lb.	0	4	0	to	0	4	3
Monochlorbenzol	lb.	0	0	10	to	0	1	0
Metanilic Acid	lb.	0	5	9	to	0	6	0
Metatoluylenediamine	lb.	0	4	0	to	0	4	3
Monosulphonic Acid (2.7)	lb.	0	8	6	to	0	9	6
Naphthionic acid, crude	lb.	0	2	4	to	0	2	6
Naphthionate of Soda	lb.	0	2	4	to	0	2	6
Naphthylamine-di-sulphonic-acid	lb.	0	4	0	to	0	4	3
Neville Winther Acid	lb.	0	7	3	to	0	7	9
Nitrobenzol	lb.	0	0	7	to	0	0	8
Nitronaphthalene	lb.	0	0	11½	to	0	1	0
Nitrotoluol	lb.	0	0	8	to	0	0	9
Orthoamidophenol base	lb.	0	12	0	to	0	12	6
Orthodichlorbenzol	lb.	0	1	0	to	0	1	1
Orthotoluidine	lb.	0	0	10	to	0	0	11
Orthonitrotoluol	lb.	0	0	3	to	0	0	4
Para-amidophenol, base	lb.	0	8	6	to	0	9	0
Hydrochlor	lb.	0	7	6	to	0	8	0
Paradichlorbenzol	lb.	0	0	9	to	0	0	10
Paranitraniline	lb.	0	2	7	to	0	2	9
Paranitrophenol	lb.	0	2	3	to	0	2	6
Paranitrotoluol	lb.	0	2	9	to	0	3	0
Paraphenylenediamine, distilled	lb.	0	12	0	to	0	12	6
Paratoluidine	lb.	0	5	6	to	0	5	9
Phthalic anhydride	lb.	0	2	6	to	0	2	9
Resorcin, technical	lb.	0	4	0	to	0	4	3
Sulphanilic acid, crude	lb.	0	0	9	to	0	0	10
Tolidine, base	lb.	0	7	3	to	0	7	9
Mixture	lb	0	2	6	to	0	2	9

Essential Oils and Synthetics

Essential Oils.		£	s.	d.
Anise	c.i.f. 1/9 spot	0	1	10
Bay		0	12	0
Bergamot		0	13	0
Cajaput		0	3	3
Camphor, white	per cwt.	4	0	0
Brown	„	3	15	0
Cassia	weak and cheaper, c.i.f. 5/6 spot	0	8	6
Cedarwood		0	1	6
Citronella (Ceylon)	c.i.f. 3/9 spot	0	4	0
(Java)	c.i.f. 4/4 spot	0	4	7
Clove		0	9	6
Eucalyptus		0	2	4
Geranium Bourbon		1	16	0
Lavender		1	16	0
Lavender Spike	dearer and firm	0	4	0
Lemon		0	2	10
Lemongrass	per oz.	0	0	2½
Lime (distilled)		0	4	0
Orange sweet (Sicilian)		0	10	6
(West Indian)		0	8	6
Palmarosa		0	18	0
Peppermint (American)		0	16	0
Mint (dementholised Japanese)	dearer and firm	0	13	0
Patchouli		1	5	0
Otto of Rose	per oz.	1	15	0
Rosemary	dearer	0	1	11
Sandalwood		1	5	0
Sassafras		0	7	6
Thyme	2/6 to	0	8	0
Synthetics.				
Benzyl acetate	per lb.	0	3	3
Benzoate	„	0	3	6
Citral	„	0	9	6
Coumarine	„	1	0	0
Heliotropine	„	0	8	0
Ionone	„	1	5	0
Linalyl acetate	„	1	2	6
Methyl salicylate	„	0	3	0
Musk xylol	dearer „	0	18	0
Terpeniol	„	0	2	9

The Teaching of Science

Professor Smithells on Present Opportunities

PROFESSOR ARTHUR SMITHELLS, in the course of his presidential address to the Science Masters' Association on Friday, January 4, in London, said that the campaign for the introduction of science teaching into schools had proceeded steadily and had extended remarkably. But a generation of science teaching had produced a disappointingly small dissemination of scientific knowledge of an available kind among our people. He thought they must admit that our science, so far, had edified and instructed far less than was reasonably to be expected from a movement that had been carried out for so long and with such vigour. He was not inviting them to any kind of despondency, for there was much to encourage them. He believed that the present time afforded an opportunity for commending science such as had not occurred since Davy and Faraday were expounding the great new knowledge to fascinated audiences in the Royal Institution. The revolutionary discoveries of the still young twentieth century were surely such as had never been known before. Nothing gave him greater hope for the future of their common task than his knowledge of their Association. If they continued strictly on the path they had so far followed they had it in their power to put science teaching in a very different position, and to put it right.

Of all the good things they had done, he reckoned none so important or so good as their declaration that school science should primarily take the form of science for all. Their action was in part a protest against the lingering assumption that a science master stood outside the body of teachers engaged in what was called general education, and that he was mainly charged with the duty of preparing a few boys for subsequent professional study.

Referring to the conditions of work in most universities, he said the theory of universities was that people went there anxious to learn and ready to endure for learning's sake. It was supposed that somehow they would get out of the teacher the best he had to give, even if he made it difficult for anyone to do so. If he were asked to say briefly what advance school science-teaching had made within his recollection, he should say that it had increased marvellously in quantity, and that science teachers had realised that the results of the school teaching of science on the university model were so disappointing as to call for a thorough-going reconsideration.

Dyestuff Licences for December

THE following statement relating to applications for licences under the Dyestuffs (Import Regulation) Act, 1920, made during December has been furnished to the Board of Trade by the Dyestuffs Advisory Licensing Committee. The total number of applications received during the month was 460, of which 367 were from merchants or importers. To these should be added 28 cases outstanding on December 1, making a total for the month of 488. These were dealt with as follows:—Granted, 381 (of which 351 were dealt with within 7 days of receipt). Referred to British makers of similar products, 71 (of which 57 were dealt with within 7 days of receipt). Referred to reparation supplies available, 19 (all dealt with within two days of receipt). Outstanding on December 31, 1923, 17. Of the total of 488 applications received, 427, or 87 per cent., were dealt with within 7 days of receipt.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.*

Glasgow, January 10, 1924.

THERE has been very little business placed during the past week, but some improvement is looked for now that the holidays are concluded.

Prices on the whole are at about the same level as last reported.

Industrial Chemicals

ACID ACETIC.—Prices well maintained. Glacial 98/100%, £60 to £67 per ton; 80% pure, £49 to £51 per ton; 80% technical, £47 to £48 per ton; all packed in casks, delivered, c.i.f. U.K. ports duty free.

ACID BORACIC.—Crystals or granulated, £48 per ton; powdered, £50 per ton, carriage paid U.K. stations, minimum ton lots.

ACID CARBOLIC (ICE CRYSTALS).—Still in little demand. Price unchanged at about 11¾d per lb.

ACID CITRIC (B.P. CRYSTALS).—Now quoted 1s. 4½d. per lb., less 5%, ex store.

ACID FORMIC 85%.—Spot material still available at about £62 per ton, ex store.

ACID HYDROCHLORIC.—In little demand. Price 6s. 6d. per carboy, ex works.

ACID NITRIC 80%.—£23 10s. per ton, ex station, full truck loads.

ACID OXALIC.—Inclined to be still lower. Now quoted 5¾d. per lb., ex store.

ACID SULPHURIC.—144°, £3 12s. 6d. per ton; 168°, £7 per ton, ex works, full truck loads. Dearsenicated quality 20s. per ton more.

ACID TARTARIC (B.P. CRYSTALS.)—Unchanged at about 1s. per lb., less 5% ex wharf.

ALUMINA SULPHATE, 17/18% Iron free.—Quoted £8 5s. per ton, c.i.f. U.K. port, prompt shipment. Spot lots obtainable at about £8 12s. 6d. per ton, ex store.

ALUM CHROME.—Price unchanged at £26 to £28 per ton, according to quality, delivered f.o.b. U.K. port.

ALUM POTASH (LUMP).—Quoted £10 17s. 6d. per ton, f.o.b. U.K. port for export. Continental material on offer at about the same price, ex store.

AMMONIA ANHYDROUS.—Unchanged at about 1s. 5d. per lb. ex station, prompt delivery.

AMMONIA CARBONATE.—Lump £29 5s. per ton. Powder, £31 per ton, f.o.b. U.K. port for export.

ALUM LIQUID 88°.—Unchanged at 3d. per lb., delivered. Containers extra.

AMMONIA MURIATE.—Grey galvanisers' quality offered at £31 to £32 per ton, ex station, spot delivery. Fine white crystals quoted £27 15s. per ton, ex store.

ARSENIC, WHITE POWDERED.—Rather better inquiry and price inclined to be higher. Spot lots now quoted £73 per ton, ex store. Slightly cheaper quotations for forward delivery. Offered from the continent at about £66 per ton, c.i.f. U.K. port.

BARIUM CHLORIDE 98/100%.—In little demand. English material unchanged at about £15 per ton, ex store.

BARYTES.—Finest white English unchanged at £5 5s. per ton, ex works. Good quality continental material offered at £5 per ton, c.i.f. U.K. ports.

BLEACHING POWDER.—English makers' price now £11 per ton, ex station, spot delivery. Contracts, 20s. per ton less.

BORAX.—Granulated, £24 10s. per ton; crystal, £25 per ton; powdered, £26 per ton, carriage paid U.K. stations, minimum ton lots.

CALCIUM CHLORIDE.—English material unchanged at £5 12s. 6d per ton, ex station. Continental difficult to obtain and now quoted at round about the same figure.

COPPERAS, GREEN.—Price about £2 5s. per ton, f.o.b. U.K. port in bulk. Packed in casks about £4 per ton, f.o.b.

COPPER SULPHATE.—Price unchanged at about £25 per ton, less 5 per cent. f.o.b. U.K. port.

FORMALDEHYDE 40%.—Quoted £63 per ton, ex store, spot delivery. In little demand.

GLAUBER SALTS.—Fine white crystals on offer at about £3 10s. per ton, ex wharf, spot delivery. Still offering from the continent at about £3 per ton c.i.f. U.K. port.

LEAD, RED.—English material unchanged at £45 per ton carriage paid U.K. station. Continental about £37 per ton, c.i.f. U.K. ports. Spot material available at £37 15s. per ton, ex store.

LEAD, WHITE.—Little spot material available. Price about £41 per ton, ex store. Offered from the continent at about £39 15s. per ton, c.i.f. U.K. port.

LEAD ACETATE.—White crystals in moderate demand, quoted £46 5s. per ton, ex store, spot delivery; brown, about 20s. per ton less.

MAGNESITE, CALCINED.—Finest English material offered at £8 per ton, ex station.

MAGNESIUM CHLORIDE.—Spot material still available at about £3 17s. 6d. per ton, ex store. Continental offers of about £2 15s. per ton, c.i.f. U.K. port, prompt shipment.

MAGNESIUM SULPHATE (EPSOM SALTS).—Commercial quality offered at about £5 per ton, ex store. B.P. quality, £6 5s. per ton, ex station, prompt delivery.

POTASH CAUSTIC 88/92%.—Good inquiry and little spot material available. Price about £34 per ton, ex store. Now offered from the continent at about £30 10s. per ton, c.i.f. U.K. port.

POTASSIUM BICHROMATE.—Unchanged at 5¾d. per lb., delivered.

POTASSIUM CARBONATE.—Spot lots still quoted at about £30 per ton, ex store. Slightly cheaper quotations from the continent at about £26 per ton, c.i.f. U.K. port.

POTASSIUM CHLORATE.—Unchanged at about 3½d. per lb., ex store.

POTASSIUM NITRATE (SALTPETRE).—Spot lots quoted £32 10s. per ton, ex store. Offered from the continent at about £24 per ton, c.i.f. U.K. port.

POTASSIUM PERMANGANATE (B.P. CRYSTALS).—Unchanged at about 10½d. per lb., ex store, spot delivery.

POTASSIUM PRUSSIATE (YELLOW).—Still in little demand. Now offered for export at 9¼d. per lb., f.o.b. U.K. port. Spot material quoted 10d. per lb., ex station.

SODA CAUSTIC.—76/77%, £19 7s. 6d. per ton; 70/72%, £17 17s. 6d. per ton; 60/62%, broken, £19 2s. 6d. per ton; 98/99% powdered, £22 15s. per ton. All ex station, spot delivery. Contracts 20s. per ton less.

SODIUM ACETATE.—Unchanged at about £26 5s. per ton, ex store, spot delivery.

SODIUM BICARBONATE.—Refined recrystallised quality, £10 10s. per ton, ex quay or station; M.W. quality 30s. per ton less.

SODIUM CARBONATE.—Soda crystals, £5 to £5 5s. per ton, ex quay or station. Alkali 58%, £8 12s. 3d. per ton, ex quay or station.

SODIUM HYPOSULPHITE.—English makers' price about £10 per ton, ex station. Continental obtainable at about the same figure. Pea crystals quoted £15 per ton, ex store.

SODIUM NITRATE 100%.—Quoted £26 10s. to £28 10s. per ton, according to quantity, f.o.b. U.K. port.

SODIUM PRUSSIATE (YELLOW).—Unchanged at about 5d. per lb., f.o.b. U.K. port for export. Spot material available at about 5¼d. per lb., ex store.

SODIUM SULPHATE (SALTCAKE).—Price for home consumption £4 5s. per ton, carriage paid station. Good export inquiry.

SODIUM SULPHIDE.—60/62% solid, £15 per ton, ex station; broken, £1 per ton more; 31/34% crystals, £9 7s. 6d. per ton, ex station.

SULPHUR.—Flowers, £10 per ton; roll, £9 per ton; rock, £9 per ton; ground, £8 per ton. Prices nominal.

TIN CRYSTALS.—Quoted 1s. 3½d. per lb., f.o.b. U.K. port.

ZINC CHLORIDE, 98/100%.—Unchanged at about £25 per ton, f.o.b. U.K. port.

ZINC SULPHATE.—Offered from the continent at about £12 10s. per ton, c.i.f. U.K. port.

NOTE.—The above prices are for bulk business, and are not to be taken as applicable to small parcels.

Coal Tar Intermediates and Wood Distillation Products

ALPHA NAPHTHOL.—Large export inquiry. Price 2s. 6d. per lb., f.o.b.

BENZIDINE BASE.—Small home inquiry. Price 4s. 9d. per lb., 100 per cent. basis.

CHROMOTROPE ACID.—Some demand. Price 8s. 6d. per lb., 100% basis.

DIPHENYLAMINE.—Home inquiry. Price firm at 3s. 3d. per lb., delivered.

DIMETHYLANILINE.—Export inquiry. Price 2s. 6d. per lb., f.o.b., drums included.

GAMMA ACID.—Home inquiry. Price 12s. 11d. per lb., 100% basis.

NAPHTHIONATE OF SODA.—Some home inquiries. Price 2s. 7d. per lb., 100% basis, carriage paid.

PARA AMIDOSALICYLIC ACID.—Small home inquiry. Price 8s. 6d. per lb., 100% basis.

PARANITRANILINE.—Some home inquiry. Price 2s. 6d. per lb., delivered.

The Manchester Chemical Market

[FROM OUR OWN CORRESPONDENT.]

Manchester, January 10, 1924.

THE chemical market here is still under the spell of seasonal quietness although there has been a trifle more activity this week than at any time since the close-down for the Christmas holidays. Most of the inquiries and actual business, however, have been in connection with contract requirements for future delivery, "spot" transactions, at the moment, apparently not interesting buyers to any very great extent. A number of inquiries for shipment, for the most part on account of Colonial markets, have been reported.

Heavy Chemicals

The demand for sulphide of sodium is still of small dimensions, although current values show no change from last week, concentrated solid being on offer at £14 10s. for 60-65 per cent., and crystals at £9 to £9 10s. per ton. Phosphate of soda is also quiet, with prices fairly steady at £14 to £14 10s. per ton. Saltcake is unchanged at £4 10s. per ton; export inquiry is still active, but not much business is being done on home account. Bleaching powder is firm and in moderate demand at £10 per ton, in casks. Alkali is a fairly active section, 58 per cent. quality being quoted at £6 15s. to £7 per ton. Caustic soda is in quietly steady demand both for home and export; prices range from £16 17s. 6d. per ton for 60 per cent. material to £19 7s. 6d. for 76–77 per cent. Hyposulphite of soda is steady at £9 10s. per ton for commercial and £15 for photographic crystals; buying interest, however, has not improved. Prussiate of soda is quiet but steadier at 5¼d. per lb. Bicarbonate of soda keeps moderately active with prices steady at £10 10s. per ton. Soda crystals are quiet but unchanged in value at £5 5s. per ton. Nitrite of soda keeps firm on continued scarcity at between £28 10s. to £29 per ton. Glauber salts are inactive at £3 10s. per ton. Bichromate of soda still meets with a fairly active demand at 4½d. per lb. Acetate of soda is quiet and a shade easier at £23 per ton. Chlorate of soda is maintained at 2¾d. to 3d. per lb., but not much business is being put through.

Caustic and carbonate of potash continue to find a ready sale; the former is still quoted at about £32 per ton for 90 per cent. strength and carbonate at up to £30 per ton for 96 per cent. material. Yellow prussiate of potash has experienced little or no improvement in demand and prices are easier again at about 9d. per lb. Chlorate of potash is maintained at last week's level of 3d. per lb., and a moderately active inquiry is reported. Permanganate of potash is quiet and unchanged at 8½d. to 9¼d. per lb.

Arsenic continues comparatively quiet both on home consumption account and for shipment, with current values at about £68 per ton for white powdered, Cornish makes. Sulphate of copper is said to have maintained the improvement reported recently, with prices varying between £25 and £25 10s. per ton, f.o.b. Epsom salts keep steady at £4 5s. to £4 10s. per ton for commercial and £6 5s. per ton for magnesium sulphate, B.P.; the demand for these materials is moderately active. Acetate of lead is unchanged at about £45 per ton for both white and brown. Grey acetate of lime is only in restricted demand at £21 per ton, with brown more or less nominal at £14. Nitrate of lead is quiet but steady at £43 to £44 per ton.

Acids and Tar Products

Acetic acid keeps in moderate inquiry and prices are firm at about £46 per ton for 80 per cent. commercial and £65 for glacial. Both tartaric and citric acids are featureless at 1s. 1½d. and 1s. 4½d. per lb. respectively. Oxalic acid continues inactive at 5¾d. per lb.

Not much business has been done in the coal-tar products, although prices have kept up fairly well. Pitch is offering at round £5 per ton, Manchester. Crude carbolic acid is quoted at about 2s. 9d. per gallon and crystals at 1s. per lb. Solvent naphtha is quiet but steady at 1s. 3d. per lb. Creosote oil is now quoted at 9½d. and is in fair demand. Refined naphthalene is now on offer at £18 per ton and crude at £6 to £11, according to grade.

German Trade and Industry

Need for Financial Reform

THE Commercial Secretary at Berlin (Mr. J. W. F. Thelwall) has forwarded to the Department of Overseas Trade a review based on the reports of the Prussian Chambers of Commerce, on the state of trade and industry during November.

No improvement occurred in the economic situation in November. Only the food position in the towns began to develop somewhat more favourably towards the end of the month, as, with the gradual introduction of stable media of payment, supplies from the country increased. The position in occupied territory continued hopeless. Its economic life, with a few exceptions, remained stagnant. The suffering of the population grew to an alarming extent and extended also to unoccupied Germany. There the possibilities of export diminished more and more, while imports of such raw materials as were formerly produced in the country increased. Unproductive work became more extensive, an exceptional rise in the costs of production occurred, and the level of prices for goods was generally very high. With the creation of stable media of payment, everything calls out for financial reform in the Reich, States, and communities and for the revival of economic life which, with the increasing burden of taxation, is rendered particularly difficult. It is being recognised more and more that such an enormous task can only be accomplished by an exceptional increase of work in all branches of industry and trade and in all parts of the State, and must be combined with an improvement in foreign affairs.

Potash and Chemicals

In the potash industry, with the exception of a somewhat more lively export of sulphates to North America, the market was very unfavourable. Further shifts had consequently to be dropped in all the works, and dismissals had partly to be resorted to. Inland business became more and more paralysed. It is hoped, however, that after the introduction of a sufficient quantity of stable media of payment the main difficulty in the purchase of potash salts will be overcome. The demand, particularly from abroad, for chemical by-products was still satisfactory. In order to offer an incentive to the immediate placing of orders for potash, the Potash Syndicate, in agreement with agricultural and trade organisations, granted a goods discount to consumers. In spite of this, however, only small orders were placed on behalf of agriculture, so that, next to April, November was the most unfavourable month of this year as far as sales were concerned.

The general economic situation necessitated further restrictions of work in the chemical industry in occupied territory. If uninterrupted communication with unoccupied Germany is not made possible the works must come to a total standstill. As regards chemical preparations the demand for laboratory chemicals was very small, and that for glass chemicals diminished in the degree in which the glassworks were compelled to restrict work or close down. The demand from abroad also fell off as sale prices approached the world's market level. It is felt to be a particular burden that just at the present time refunding of the British Reparation Levy should have been the discontinued and thus all possibility of selling German products to England removed. It is all the more to be regretted as French competition is greatly felt in England and will now secure the whole trade without effort. A slight revival of both inland and foreign trade in the remaining chemical preparations was reported.

Company News

BROKEN HILL SOUTH.—A dividend at the rate of 1s. 6d. per share has been declared, the same as a year ago.

ROYAL DUTCH PETROLEUM CO.—The directors have declared an interim dividend for the year 1923 at the rate of 10 per cent., payable on January 16.

NOBEL INDUSTRIES, LTD.—The transfer books for the preference shares will be closed from January 17 to 31, both days inclusive.

DOMINION TAR AND CHEMICAL CO., LTD.—It is announced that the directors have authorised the payment, on or before January 14, of the usual interim dividend of 2½ per cent., free of income tax.

LEWIS AND PEAT, LTD.—The directors report a profit for the year 1922 of £24,398, subject to corporation tax. For the previous year there was a loss, after appropriating £174,093 for bad debts and providing for preference dividend, of £60,757.

BELL'S UNITED ASBESTOS CO., LTD.—The transfer book and register of the 6 per cent. cumulative preference shares will be closed from January 17 to 31, both days inclusive, for the preparation of the warrants for the dividend payable on February 1.

DE BEERS CO.—It is understood that an arrangement has just been completed under which the explosive and fertiliser factories of the De Beers Co. will be transferred to a new company, which will also take over the factories in the Union of Messrs. Nobel, the capital of the new company being held jointly.

ELECTROLYTIC ZINC CO. OF AUSTRALASIA, LTD.—At the annual general meeting held in Melbourne on October 30 last, the chairman, in the course of his speech, said that apart from the actual financial results, the outstanding feature of the reports of the directors and the general manager was the steadily increasing production of zinc throughout the year—from 70 tons per day in June, 1922, until June, 1923, the output reached 115 tons per day. Since then there had been a further increase, and the average was now above the estimated figure of 120 tons per day.

AMALGAMATED ZINC (DE BAVAY'S).—The report for the half-year ended June 30 last shows that, after transferring £6,796 to reserve for depreciation, the gross profit on working account amounted to £26,885. After adding £9,465, dividends received from other companies and revenue from interest etc., and taking into consideration profit and loss debits, the net profit was £26,731, to which was added £39,078 brought forward. Two dividends, absorbing £50,000, were paid, leaving credit balance of £15,810 carried forward. Since the close of the half-year the thirty-fourth dividend of 1s. per share was paid on August 2 last.

CHAMPION AND SLEE, LTD.—The accounts for the year ended September 30 last disclose a trading profit of £17,190, to which has to be added the balance of £2,264 brought forward, making a total of £19,454. After allowing for management expenses and depreciation and providing for the preference dividend for the nine months to June 30, 1923, there remains available £10,905. The preference dividend for the final three months of the year will absorb a further £1,050, and out of the remaining balance it is proposed to pay a dividend on the ordinary shares of 10 per cent. for the year, leaving £2,855 to be carried forward.

WESTMINSTER BANK, LTD.—The net profits for the past year, after providing for bad and doubtful debts, and all expenses, amount to £1,804,783. This sum, added to £536,585 brought forward from 1922, leaves available the sum of £2,341,368. The dividend of 10 per cent. paid in August last on the £20 shares and 6¼ per cent. on the £1 shares absorbs £631,269. A further dividend of 10 per cent. is now declared in respect of the £20 shares, making 20 per cent. for the year; and a further dividend of 6¼ per cent. on the £1 shares will be paid, making the maximum of 12½ per cent. for the year. £100,000 has been transferred to bank premises account, £300,000 to rebuilding account, and £100,000 has been placed to contingent fund, leaving a balance of £568,480 to be carried forward.

ALLEN-LIVERSIDGE, LTD.—The report of the directors for the year ended October 31 last shows that the net profit was £41,365, to which is added the balance brought forward from last year, £4,721, and excess profits duty over-reserved in previous years transferred from taxation reserve, £7,150, making £53,236. Against this have been charged the balance of discount and commission on debenture stock issue made in February, 1922, £4,000 reserve for equalisation of future taxation, £1,500, to general reserve, £1,150, to reserve against patents and development account, £13,850, leaving a balance of £32,736. The directors recommend a final dividend of 7½ per cent. (less tax), making 12½ per cent. for the year, leaving to be carried forward £4,719. The directors have decided that the next financial period of the company shall be one of six months only, ending on April 30, and that thenceforward the financial year shall end on that date in each year.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

PIGMENTS, ETC., FOR SOUTH AFRICA.—A firm of paint manufacturers established in Cape Town are desirous of obtaining quotations for pigments, sulphate of zinc, zinc oxide, precipitated chalk and casein (lactic), which they are at present importing from foreign countries. (Reference No. 40).

METALS REQUIRED IN GREECE.—A British firm of general commission and insurance agents in Greece desire to represent on a commission basis, in Patras, and in the Piræus if required, a British firm in London or Liverpool exporting metals, in particular tin, tinplates and galvanised iron sheets. (Reference No. 48.)

ULTRAMARINE BLUE FOR SPAIN—A commission agent of Barcelona is desirous of securing the representation of British firms exporting ultramarine blue. (Reference No. 55.)

EDIBLE COTTON SEED OIL.—A firm of commission agents in Antofagasta wish to obtain the representation of refiners or exporters of edible cotton seed oil, soya bean oil, and corn oil. (Reference No. 60.)

Tariff Changes

AUSTRALIA.—The following chemicals have been added to the list of goods liable to "dumping duties":—Carbide of calcium from any country; nitrate of soda and chloral hydrate from Germany.

CZECHO-SLOVAKIA.—Goods in the following list may now be imported without licence, subject to a "declaration" by the importer:—Stearic and palmitic acids; chemical paper, except indigo and carbon paper; metallic antimony, sulphur, phosphorus and quicksilver; hydroxide of sodium; caustic lye; oxide of zinc, artificial; sub-oxide of lead; peroxide of hydrogen; sulphate of potassium; soda, raw or in crystals; calcined soda, liquid silicate of sodium; sodium sulphide, in crystals; combinations of iron, chrome, and aluminium; cresol; collodion; chloroform, etc.; manures, etc., except nitrates (import of bones is free). Articles of platinum for scientific and industrial purposes may be imported without declaration or licence.

SWITZERLAND.—The import duty on crystallised soda has been increased from 1 fr. to 4 fr. per 100 kilos as from December 14, 1923.

Tasmanian Carbide Manufacture Resumed

THE Tasmanian carbide works at Hobart, which have had several stoppages on account of the dumping of foreign carbide, are once more to be in full swing, consequent upon the Commonwealth Government having granted the company's request for adequate protection. Acting upon the recommendation of the Tariff Board, the Government has issued a proclamation under the Industries Preservation Act which with freight charges will bring the protection up to practically 100 per cent. The fair market value of carbide in any country and imported into Australia has been fixed at £13 9s. 2d. per ton. If carbide is invoiced at less than that amount a dumping duty will be charged representing the difference between that price and £13 9s. 2d. In addition a dumping freight duty will be charged when the sea freight charges are under £5 a ton. As the import duty is £7 10s., freight charges will bring the protection up to nearly 100 per cent., and this leaves out of account any dumping duties that may be applied.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgments

[*NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.*]

WOOD, Mr. C., trading as WOOD'S MEDICINE AND CHEMICAL CO., 38, Mill Street, Ormskirk, chemists' sundriesman. (C.C., 12/1/24.) £32 13s. 7d. November 16.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act, of 1908, provides tha every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.*]

CLEMENT AND JOHNSON, LTD., London, W.C., chemists. (M., 12/1/24.) Registered December 28, £100 and £2,500 debentures part of £60,000; general charge. *£38,700. January 12, 1923.

HEXHAM CHEMICAL MANURE CO., LTD. (M., 12/1/24.) Registered December 28 (by order on terms), £900 mortgage, to W. H. Ritson, Springwell Hall, near Durham, colliery proprietor and another; charged on properties near Tyne Green, Hexham.

Satisfactions

MARKHAM SONS AND CO., LTD., Derby, disinfectant manufacturers. (M.S., 12/1/24.) Satisfaction registered December 29, £1,200, registered July 8, 1916.

London Gazette

Companies Winding Up Voluntarily

INDESTRUCTIBLE PAINT CO., LTD. (C.W.U.V., 12/1/24.) F. W. Lord, 37, Walbrook, London, E.C., chartered accountant, appointed liquidator.

TIGAR'S MANURE CO., LTD. (C.W.U.V., 12/1/24.) By extraordinary resolution, December 21, 1923.

WILKINSON HEYWOOD AND CLARK (SYDNEY), LTD. (C.W.U.V., 12/1/24.) A. A. Coldrey, appointed liquidator. Meeting of creditors, General Buildings, Aldwych, W.C.2, on Tuesday, January 15, at 3 p.m.

WILKINSON HEYWOOD AND CLARK, LTD. (C.W.U.V., 12/1/24.) A. A. Coldrey appointed liquidator. Meeting of creditors, General Buildings, Aldwych, W.C.2, on Tuesday, January 15, at 3 p.m.

ZOG, LTD. (C.W.U.V., 12/1/24.) R. N. Locking, Lever House, Blackfriars, London, E.C.4, chartered accountant, appointed liquidator. Meeting of creditors, Lever House, Blackfriars, London, E.C.4, on Thursday, January 10, at 12 noon.

New Companies Registered

ELSTREE BLEACHING AND DYEING CO., LTD.—Manufacturers of and dealers in chemicals and dyestuffs of all kinds. Nominal capital, £10,000 in £1 shares. (7,000 "A" and 3,000 "B"). Solicitors: Penman and Brown, 31, High Street, Watford.

J. ENGLISH AND CO., LTD., 108, Wellington Road, Forest Gate, London, E.7. Oil blenders and manufacturers, grease specialists, etc. Nominal capital, £2,500 in £1 shares.

JOHN HARTROP, LTD. Manufacturers, merchants or factors of chemicals, chemical products, acids, and oils of all descriptions, etc. Nominal capital, £1,000 in 980 ordinary shares of £1 each and 400 founders' shares of 1s. each. Secretary: J. Troop, 40, Greville Street, Rusholme, Manchester.

METALLURGY, LTD., 9, Dawson Street, Dublin. Importers, exporters, metallurgists, chemists, etc. Nominal capital, £5,000 in £10 shares.

NEXELLON, LTD.—Wholesale, retail and analytical chemists, importers of, agents for, and dealers in drugs and chemicals, etc. Nominal capital, £5,000 in £1 shares (4,000 "A" and 1,000 "B").

RECKITT'S (IRELAND), LTD., Edmondstown, Rathfarnham, Co. Dublin. Manufacturers of and dealers in starch, washing blue, ultramarine, black lead, carbon black, etc. Nominal capital, £150,000 in £1 shares.

W. SWAN AND CO., LTD., Westfield Works, Westfield Road, Wrose Hill, Shipley. Importers, exporters, manufacturers, buyers and refiners of oils, fats, waxes, soaps, fine and heavy chemicals, etc. Nominal capital, £6,000 in £1 shares.

S. AND R. TAYLOR, Gigg Dyeworks, Bury, Lancs. Bleachers, dyers and finishers. Nominal capital, £5,000 in £1 shares.

THE INDESTRUCTIBLE PAINT CO., LTD., King's House, King Street, Cheapside, London, E.C. Manufacturers, exporters and importers of and dealers in paints, enamels, varnishes, stains, dyes, colours, inks, oils, drugs, chemicals, etc. Nominal capital, £100,000 in £1 shares.

WELLCOME FOUNDATION, LTD., 67, Holborn Viaduct, London, E.C.1. Wholesale and retail chemists and druggists; manufacturing, alkaloidal, synthetic, analytical, experimental nd research chemists, etc. Nominal capital, £1,000,000 in £1 shares.

Official Chemical Research in India

In the Annual Report for 1922–23 issued by the Department of Industries of the Bombay Presidency, it is stated that during the period under consideration owing to the absence of new industrial enterprise and the departmental retrenchment, there were no fresh developments in chemical research. The difference of opinion between the Department and the Imperial Institute, London, as to the best method of determining the fat in casein is still unsettled, the Bombay Department holding that the Meldrum-Gangoli method is more reliable than the Werner-Schmidt method recommended by the Imperial Institute. The Pioneer Magnesia Works at Kharaghoda continued producing magnesium chloride during the year but prices have been steadily falling, and it was necessary for Government to revise the basis on which royalty was taken and this is now on a profit-sharing basis. At the moment the imported magnesium chloride is at such a low price that it is practically impossible for the Pioneer Magnesia Works to produce at a profit, and there seems justification, states the report, for an inquiry into whether this is not a suitable case for the introduction of a measure of protection by tariff. Experiments were undertaken during the year by Mr. Turner with a view to finding a means of removing the discolouration of the magnesium chloride produced at Kharaghoda and these were finally successful and the necessary information was communicated to the company.

Safranin as a Photographic Desensitiser

According to the *Archives of Radiology and Electrotherapy*, Dr. A. Brude MacLean has tested the use of safranin (phenosafranin) as a desensitiser in developing X-ray negatives. A pair of films were inserted in a filmholder and exposed for each part radiographed. One film of the pair was developed by the usual routine, in a Kodak developing tank, the other was treated to an aqueous bath of safranin (1 in 5,000), well rinsed and then inserted in the developing tank. Development by a weak white light (such as a single candle) may then be carried out with safety. It was found that, with correctly exposed negatives, any advantage gained by the method is so slight as to be negligible. With under-exposed negatives the method is not to be recommended. With over-exposed films better results are obtainable than by the usual method of development, as the dye acts as a powerful restrainer of development.